

THE AMERICAN JOURNAL OF PHARMACY.

JULY, 1892.

THE ASSAY OF ALKALOIDAL PREPARATIONS EXEMPLIFIED BY THAT OF FLUID EXTRACT OF NUXVOMICA.

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The original feature of the method of assay described in the following paper is similar to that offered for Fluid Extract of Guarana.¹ The results obtained are such as will probably occur with any person who will exercise ordinary care, although, from the nature of the case (as will be seen) some variation in results should be expected. The details of manipulation are given rather more in detail than is usually necessary, but these will please some persons who are interested in this work, although naturally unnecessary with others. One series of rotations is saved, it is seen, by this modified method as compared with the general scheme announced a year ago.² The use of the "iron magma" prevents subsequent emulsions, and carries the alkaloid quickly into a neutral solvent, and this is the characteristic feature of the general scheme. From this solvent its abstraction is but a matter of routine work, and such variations in returns as occur with the process depend upon this subsequent part of the manipulation, for all of the alkaloid is abstracted from the "iron magma."

It may not be out of place to repeat that assaying to total

¹ See American Druggist, May 15, 1892, p. 146, where a description of the mechanical mixer and form of graduate most suitable for the use of the latter will be found.

² To Prof. Simon the plan of this method was described in New Orleans during the meeting of the A. P. A., and it would have been published sooner but for experiments of Prof. Norton that I did not wish to forestall.

alkaloids cannot prevent alkaloidal substitution. I take it for granted that this is not a problem with manufacturers, for they all desire to produce uniform products; none can afford to sanction intentional sophistication, but, upon the contrary, all aim to preserve their commercial standing and uphold the integrity of the profession. The variation in the commercial specimens that have come under my observation is certainly not the result of intentional mismanagement, and I have met with no evidence of cheaper alkaloids having been substituted for those less expensive.

Prof. Hallberg, at the Indianapolis meeting of the Indiana Pharmaceutical Association, stated, quite correctly, that an assay of *Nux Vomica*, to be complete, should give the relative proportion of each alkaloid. To this all will agree, but, at present, it seems that all we can hope to accomplish will have been obtained if a standard for the mixed natural alkaloids be established. In this the proportion will not, as a rule, vary greatly from equal amounts of strychnine and brucine. In this connection, I can say that one specimen of fluid extract in the following list was valued by the manufacturer, to (1) extractive matter, (2) mixed natural alkaloids, (3) strychnine, and (4) brucine; thus showing that to one maker, at least, it would not be burdensome now to attempt closer valuation.

Prof. Norton remarked, concerning the general method announced by me a year ago, as investigated by himself, that "it is probable that more extended experiment will lead to modifications restricting still further the range of variation, as well as extending the range of application." It remains to be seen if this paper furthers the prediction in any way other than supporting the fact stated in his paper, that, regardless of the method employed, increase in weight may be expected with chloroformic residues of brucine.

In the preceding paper on this subject (see *Am. Druggist*, May 15), tests concerning the absolute abstraction of the magmas from fluid extract of guarana were neglected. Caffeine being so nearly tasteless in small amounts and so indifferent to alkaloidal reagents will not respond to tests with the readiness of most other alkaloids and is difficult to establish exactly, when in minute amounts. Perhaps the best method is to crystallize and weigh it, which is impractical with traces.

I have noticed in attempts that are made occasionally to compare different assay methods, that the opinion seems to prevail that the

highest result should be taken as the standard. This I believe is not always warranted. We have as yet much to learn concerning the amount of true crystallizable or active alkaloïds in some of these crude amorphous residues. Where the work is checked by testing of residues to show complete abstraction of alkaloid, for alkaloids that *do not wear out in manipulation*, the *lowest* result would probably indicate the nearest true average.

The method of assay suggested herein need not, in its application, require the personal attention of an expert chemist, the chief chance for variation being in the drying and weighing of the final residue, which is not confined to this method, but occurs alike with all gravimetric schemes. Many of the evaporations of the following experiments were made in deep platinum dishes and these were most satisfactory, although unnecessary for approximate valuations.

Notwithstanding such experimental variations, which exist even with absolutely pure alkaloids, the gravimetric method seems preferable to the volumetric by reason of the difficulty of establishing the end reaction with alkaloidal reagents. One of the pressing desideratums of this day is that of a delicate alkaloidal color indicator.

Process.—The process may be divided into sections, as follows:

TO ASSAY FLUID EXTRACT OF NUX VOMICA.¹

(1) Into the graduate pour 5 cc. Fluid Extract of *Nux Vomica* and 10 cc. of Chloroform, then add 8 grams of Iron Mixture,² stir together, and add Glucose Mixture³ (from 2 to 4 cc.) enough to form a pulp.

Stir briskly and decant the chloroform into a beaker glass, then successively wash the magma with two portions of chloroform, each 10 cc., decanting each into the beaker. Should the magma adhere to the sides of the graduate above the stirrer, scrape it down occasionally by means of the spatula side of the stirrer.

Evaporate the chloroform, pour upon the residue 6 cc. dilute (1 to 49 by measure) sulphuric acid, warm gently and filter through a

¹ This process without the mechanical mixer was the one I suggested to Prof. Norton, and which was employed in the University of Cincinnati determinations. (See Journ. Anal. and Applied Chemistry, March, 1892.)

² Equal amounts of dry ferric hydrate and sodium bicarbonate, mixed.

³ Equal measures of glucose and water.

small paper into a 4 or 8-ounce globular separating funnel.¹ Wash the residue in the beaker twice, with diluted acid 4 cc. each time, stirring the undissolved fat with the acid by means of a glass rod, and filter through the afore-named filter into the first acid solution and then wash the paper with a little water.

(2) Make the mixed acid liquids alkaline with ammonia and add 10 cc. chloroform; rotate (not shake) a moment, then abstract the underlying chloroform into a tared evaporator. Repeat the washing with two successive portions each of 10 cc. chloroform, abstracting them into the vessel with the first portion. Evaporate the chloroform, bring the residue to constant weight in a drying room, and multiply its weight expressed in grams, by 20. The result will be the alkaloidal percentage of the fluid extract.

Remarks.—This alkaloidal residue consists practically of about equal amounts Brucine and Strychnine.²

In making a series of comparative tests, the final glasses should be kept together in the desiccator and the weighings should be made at one time in order that similar conditions may be maintained. In damp weather care must be observed to weigh quickly or the operator will be led into error by reason of the hygroscopic nature of the glass and residue.

EXPERIMENTS WITH ALKALOIDS OF NUX VOMICA.

(1) *Abstraction of Brucine from Chloroform.*—That some alkaloids fail to return to original weights when evaporated from chloroformic solution has been shown by Prof. Norton and Mr. Nichols, and occurred to the writer in previous experiences, and among them brucine is conspicuous.³ To Prof. Norton and Mr. Nichols, however, is due the credit of calling public attention to the remarkably increased weight in brucine, when deposited from chloroform, their report being summarized as follows:⁴

¹ Upon application to the author, a pamphlet will be mailed concerning these manipulations.

² Owing to the increase in weight of brucine after solution in chloroform, the result is a trifle high as compared with dry brucine, but about right considering the commercial crystals.

³ See also my pamphlet contributed to the Cincinnati Chemical Society, April 15, 1892, printed September 1, 1891, which will be mailed on application.

⁴ Journ. Anal. and App. Chem., March, 1892, p. 172.

Average of 0.1 gm., five experiments, increase, 8.9 per cent.

" 0.05 " " " 8.4 "
" 0.01 " " " 5.5 "

As bearing on, and supplementary to, their experience, the following results are taken from my own recent work, these being similar to others I have experienced formerly that it is not necessary to give:

TABLE I.—EXPOSURE OF RESIDUE.

	Amount used.	1 Hour.	2 Hours.	5* Hours.	12 Hours.	100 Hours.	
	gm.	gm.	gm.	gm.	gm.	gm.	
A	0.020	0.023	0.0225	0.022	0.022	—	} One make of brucine.
B	0.050	0.056	0.055	0.0535	0.054	—	
C*	0.100	1.065	0.105	0.105	1.105	—	
D	0.020	—	0.025	0.0215	0.0215	0.021	} Another make of brucine.
E	0.050	—	0.056	0.054	0.054	0.0505	
F	0.100	—	0.115	0.116	0.105	0.1005	

* Intermission over-night in which the dry room cooled ten hours before next exposure during which the residue often increased materially and did not fully recover.

These statements show that material increase in the weight of brucine follows its solution in chloroform, and while the writer's figures add nothing else to Prof. Norton's paper, they demonstrate that this phenomenon has been observed independently and is not confined to one make of brucine.¹

For our present purpose it is important to know that by the gravimetric method, in consequence of the increase of brucine, the apparent yield of mixed alkaloids of *nux vomica* will be higher than the real, unless lengthy (impractical) exposure of the residue to high temperature be made, in order to bring the alkaloidal residue to constant weight. The fact that this increase in weight is not uniform, and also that the temperature employed during the evaporation, as well as contact or contacts, of brucine and chloroform and duration of the exposure of the residue, influences this result, is sufficient to convince most persons that different operators should not be disturbed if they do not exactly agree in final results.

¹ Prof. Norton has determined to continue the study of this interesting and important subject, and a thorough inquiry will be made in this direction, and connected relationships chemically (if any exist) will be established.

Indeed, exact concordance of returns may be viewed, at present, with suspicion.

Brucine separates (mostly) amorphous from chloroform, and, if it be mixed with equal amounts of strychnine, overcomes the crystalline nature of that alkaloid. Hence, the crude alkaloidal residue from fluid extract of *nux vomica* is amorphous.

2. *Is Brucine completely extracted from the Iron Magma?*—Each of the residues, A, B and C, of the previous experiment (Table I) were dissolved separately in 5 cc. of a mixture of alcohol 8, water 1 (official menstruum for making Fluid Extract of *Nux Vomica*), and abstracted by the foregoing method for assaying Fluid Extract of *Nux Vomica*. The chloroform was evaporated without boiling, in the drying room, and the residue exposed to the temperature of 140° F. for two hours.

TABLE II.—RESULTS.

	Amount Used.	Amount Obtained.
A,	0.020 gm.	0.021 gm.
B,	0.050 "	0.055 "
C,	0.100 "	0.120 "

Neither the dried residual iron magma nor its solution in diluted sulphuric acid gave any taste of bitterness, nor alkaloidal reaction. There seems no reason to doubt that the brucine to the limit of perception is abstracted, leaving the iron residue clean alkaloidally.

(3) *Strychnine from Chloroform*.—Strychnine crystallizes when left by evaporation from chloroformic solution, and as the final chloroform disappears, unless precautions are taken to avoid the disturbance, more or less of the strychnine may be lost by minute crystals springing from the dish.¹ This fact, I now hold, largely accounts for discrepancies with strychnine recoveries that seem to have been misinterpreted by others as well as myself, for I can see no other explanation for loss of alkaloid.²

Prof. Norton said of it, "Strychnine exhibits great variation, with

¹ See note Am. Druggist, May 15, p. 151. The same is true of caffeine. These substances will often spring several inches in height and in considerable quantities.

² Prof. Norton and Mr. Nichols (Jour. Anal. and App. Chem., March, 1892, p. 172), from an average of ten experiments lost 0.7 per cent. of the strychnine, by evaporation in ordinary dishes, but the individual results were very discordant.

tendency to loss." I may add that with proper precautions, in the natural combination with brucine, this "tendency to loss" is mostly, if not entirely, overcome, for brucine renders it amorphous and prevents it from crystallizing and springing from the dish. This loss may also be prevented largely by using tall beaker glasses or flasks for evaporators, but even then, if rapid boiling is permitted, the top of the vessel may with advantage be covered with a fine wire gauze, tared previously with the vessel and weighed with it afterward. The following experiments indicate the varying results without such precautions:

TABLE III.

0.020 gm. of strychnine from chloroformic solution lost by boiling to dryness in an open beaker glass (3 inches deep, 2½ inches wide,) 0.002 gm.

0.522 gm.,	lost	0.066 gm.
0.100 "	"	0.0055 "
0.100 "	"	0.015 "

When the beakers were covered with fine wire gauze (No. 60 steel, nickel-plated), under like conditions, no loss was experienced.

By spontaneous evaporation in deep platinum dishes and final dry room exposure no loss occurred.¹

Other experiments coincided with the foregoing, and it may be accepted that in assay work, with precautions to avoid such disturbances, the loss of strychnine is not enough to overcome the gain in brucine.

(4) *Is Strychnine completely abstracted from the Iron Magma?*—

By abstracting known amounts of strychnine, according to the usual process, from the officinal menstruum for making the fluid extract, it was found, as with brucine, that the magma was completely depleted of alkaloid. Neither the sense of taste nor testing the depleted magma chemically could detect it; rapidly evaporating the chloroformic solutions therefrom, however, when no alkaloid remained in the magma, resulted in variable returns, the loss ranging from 0.001 to 0.015 gm. to each portion of chloroformic solution of strychnine (0.100 gm.) operated upon, which, however, was not greater than resulted from the rapid evaporation of chloroformic solutions of known amounts of strychnine (see Table III) In both

¹ The objection to spontaneous evaporation is from the time required.

cases the loss was mechanical and mostly avoided by employing flasks, or deep platinum dishes and gauze covers, or spontaneous evaporation.

It was shown experimentally before the Cincinnati section of the Am. Chem. Society at the meeting of May 19, that the iron magma after its abstraction gave no alkaloidal reaction and was not bitter to the taste, the chloroform solutions yielding (evaporation by boiling) 98.44 per cent. of the strychnine used. There seems to be no reason to doubt, even if the chloroformic residue does not give the calculated amount of strychnine, that the magma may have been thoroughly abstracted.

(5) *Mixtures of Brucine and Strychnine*.—Brucine acts favorably when associated with strychnine, from a gravimetric view, as previously stated, for it keeps that alkaloid in an amorphous condition and thus prevents a loss that is otherwise difficult to entirely overcome.

One gm. each was dissolved in 100 cc. of the officinal menstruum for making fluid extract of *nux vomica*, and known amounts abstracted by the usual process.

TABLE IV.

	Gave	Calculated.
5 cc.,	0.107 gm.	0.100
2.5 cc.,	0.056 "	0.050
1 cc.,	0.022 "	0.020

Subsequent investigations demonstrated the complete abstraction of each magma. It was neither bitter nor capable of yielding alkaloidal reactions. In this connection, the following statement of Norton and Nichols is in order:

"A further test of the delicacy of the process was shown by the following experiment:

0.0001 gm. of a mixture of brucine and strychnine was put through the assay and the residue on the watch-glass, though not visible, still yielded the bitter taste of the alkaloids."¹

Summary.—The foregoing experiments seem to show that there is no loss in weight of alkaloid in this part of the assay method, but, upon the contrary, an appreciable increase in weight over that of the true mixed alkaloids really present. The iron magma is completely abstracted. Unless there is a loss in the subsequent rotations, the method of assay should, therefore, give slightly exagger-

¹ Jour. Anal. and App. Chem., March, p. 165.

ated results, providing that natural alkaloids yield as readily to the treatment as those just considered.

PART THIRD.

(6) *Abstraction by Chloroformic Rotations*.—There is no question but Prof. Norton has demonstrated that two rotations with 10 cc. each of chloroform practically abstract the mixed alkaloid from the acid solution obtained by the iron magma of the assay process. As may be anticipated, this, if accomplished, should result in an apparent increase in weight of the residue (see Brucine) and, hence this assay method is in favor of rather than against the preparation examined. To a fluid extract that gave an average of 1.44 per cent. alkaloid, Norton and Nichols added a known amount of brucine and strychnine, and by chloroform rotations obtained 1.99 per cent. where there should have been but 1.94 per cent.¹ This increase occurred in complete assay, beginning with the iron magma. An average of 20 rotations with brucine gave a gain of 12 per cent. An average of 20 rotations with strychnine gave a loss of 9.4 per cent.; the comparative result being a gain of 2.8 per cent. It may be accepted confidently, as has been established I think, that the weight obtained by the *first* rotation will not be less than that of the alkaloid present, and, also, that we need not draw upon the irrational theory that sulphate of ammonia has been dissolved by chloroform, to account for an increase in weight over the dry alkaloid known to be present in test experiments. It seems scarcely necessary to present further evidence in this direction, but, the following figures may be considered supplementary to the work of the gentlemen alluded to.

A solution was made of 0.050 gm. each, strychnine and brucine, in 5 cc. of a mixture of alcohol 8 parts, water 1 part. Of this, three portions of 5 cc. each were evaporated in platinum dishes by exposure in a drying room to a temperature of 170° F.:

TABLE V.

	One Hour Exposure.	Three Hours Exposure.
A,	0.104 gm.	0.1035
B,	0.105 "	0.1045
C,	0.105 "	0.104
Average,	0.1046	0.104

¹ Pharmaceutische Rundschau, May; Am. Druggist, May 15, and Journ. Anal. and App. Chem., March, 1892.

Calculated amount 0.100 gm., showing an increase from this hydro-alcoholic solution of 4 per cent.

The residues were dissolved in chloroform and again evaporated.

TABLE VI.—RESULT.

One Hour. 0.1170	One Hour. 0.116	One Hour. 0.119
Three Hours. 0.1135	Three Hours. 0.111	Three Hours. 0.110

These residues were then dissolved in chloroform and allowed to slowly evaporate spontaneously in a cold glass case for 48 hours, then heated at 170° F.:

TABLE VII.—RESULT.

One Hour. 0.1120	One Hour. 0.111	One Hour. 0.111
Three Hours. 0.1120	Three Hours. 0.111	Three Hours. 0.110

Average of twelve experiments, 0.1128.

It was, therefore, shown that, while 5 cc. of this solution gave by direct evaporation, not less than 0.104 gm. by evaporation from hydro-alcoholic solution, that the average of twelve experiments with chloroformic solution (Nos. vi and vii) was 0.1128 gm. Hence, by chloroformic rotation the total residue should range between the minimum 0.110 gm. and the maximum 0.119 gm., the average being 0.1128 gm.

To arrive at the facts, three experiments, 5 cc. each, were made of the afore-named solution (No. v). The alcoholic solution was evaporated to dryness in a platinum dish and the residue dissolved in small portions of diluted sulphuric acid (1 to 49) and poured into the rotator, then it was made alkaline with ammonia and abstracted by successive portions of chloroform, 10 cc. each :

TABLE VIII.

First rotation, 10 cc. of chloroform,	0.102
Second " " "	0.012
	<hr/>
	0.114
First rotation, 10 cc. of chloroform,	0.1075
Second " " "	0.007
	<hr/>
	0.1145

First rotation, 10 cc. of chloroform,	0'107
Second " " "	0'005
	<hr/>
	0'112
First rotation, 10 cc. of chloroform,	0'106
Second " " "	0'0045
	<hr/>
	0'1105
Average of 4 experiments,	0'1128 gm.
" calculated from 12 direct residues (Tables VIII and IX),	0'1128 gm.

The aqueous liquid from each experiment was acidulated with H_2SO_4 . It was neither bitter to the taste nor capable of reacting with Mayer's solution, showing that it had been completely abstracted and that further rotations were unnecessary.¹

These alkaloidal residues were perfectly soluble in both chloroform and diluted sulphuric acid, and could have contained but traces of impurity.

Summary.—The result of these experiments demonstrates:

- (1) That chloroform rotations will completely abstract strychnine and brucine from alkaline aqueous solution.
- (2) That the first rotation of 10 cc. yields a residue heavier than the original total dry alkaloid.
- (3) That a third rotation is unnecessary, for the alkaloid is all abstracted by two treatments.²

PART FOURTH.

STANDARD OF ALKALOIDAL VALUE FOR FLUID EXTRACT OF NUX VOMICA.

(7) *Will this Method abstract all the Natural Alkaloid from Fluid Extract of Nux Vomica?*—While it is true that chloroform

¹ At the New Orleans meeting of the A. P. A., Prof. Patch alluded to the fact that the chloroform adhering to the exit of a separating funnel accounted for much of the loss in some cases. This I have verified more than once. In fact, the larger share of an alkaloid is usually abstracted in the first chloroform, if it be drawn close to the water line.

² These averages are higher than those of Prof. Norton and Mr. Nichols, who, however, evaporated their solutions rapidly in shallow dishes. My recoveries were made in platinum dishes, by drying room exposure, without ebullition. I hold myself entirely responsible for their variations, as they were obtained according to my former process, in which I commended shallow dishes. I alone am to blame.

abstracts all of the "added" alkaloids from the magma, a question may arise as to whether natural alkaloidal compounds are also totally disintegrated. Artificial solutions of alkaloids and of alkaloidal salts may behave quite differently from those of natural combination, and, if the ferric magma does not completely decompose the natural alkaloidal compound it is probable that the chloroform will fail to abstract the alkaloid from the amount unaffected.

With a view to satisfy those to whom such a question may occur, as it did long since to the writer, the following experiments are introduced.

A young lady operator made an abstraction of the iron magma, without unusual precautions, of 5 cc. each of thirteen fluid extracts. The ferric magma from each was separately exposed to a temperature of 140° F., with occasional stirring, until all the adhering chloroform had evaporated. It was not bitter. Then it was digested with excess of diluted sulphuric acid and filtered. The clear filtrate was not bitter in any instance.¹ This sense of taste with these intensely bitter alkaloids some will consider the most conclusive evidence of the absolute abstraction of the strychnine and brucine. However, each filtrate was subsequently tested for alkaloid with Mayer's reagent, but without reaction. In order to find if it were possible for the sulphates of iron and sodium present to obscure the action with Mayer's test solution, minute amounts of solution of strychnine and brucine (one minim of a solution of 0.010 gm. each, in 5 cc.) were added to the acid solution in a test tube, when the characteristic cloudiness instantly appeared. The iron and soda magma had thoroughly dissociated the natural alkaloidal compound and the abstraction of the alkaloid therefrom was so complete that neither the sense of taste nor Mayer's test were able to detect traces of alkaloid in either the magma or a solution of it.²

(8) *Commercial Fluid Extracts of Nux Vomica*.—Thirteen specimens of fluid extract of nux vomica were procured in the drug

¹ One part of strychnine in 500,000 parts of solution is bitter. (U. S. D.) Brucine is more bitter than strychnine. (Lyons.)

² The use of this iron magma is the principal innovation known as my method of assay. It is but one step in alkaloidal determinations, however, the subsequent manipulations having long been well established.

market, in original vials, and severally assayed, according to the formula given on p. 339.

Every precaution was taken to preserve uniform conditions. The analyses were made successively by the author, without interruption, the exposures and evaporations were under identical conditions and the weighings of each set were accomplished as rapidly as possible. The operator worked by numbers, not being conversant even at this stage, with the names or the identity of the several specimens.¹

Dry Extract.—Previous to assay, 5 cc. of each were separately evaporated in beaker glasses ($2\frac{1}{2} \times 3$ inches) by exposure to the drying room temperature of 140° F., the exposure being continued three hours after the alcohol had disappeared. Where large amounts of residue resulted they were stirred occasionally with the tip of the blade of a penknife to insure perfect dryness. The glasses were then simultaneously transferred to a desiccator and cooled ten minutes, then weighed as rapidly as possible. The results expressed in percentages are shown by column No. 2 of the following table.

Chloroformic Extract.—5 cc. of each specimen was abstracted by the first part of the process of the formula for assay (p. 339) and the total chloroformic solution of each evaporated in a beaker glass, by exposure to 140° F. The residues were exposed to the same temperature for six hours after the chloroform had disappeared and were then cooled in a desiccator and weighed. Their weights, expressed in grams and multiplied by 20, gave the percentage shown by column No. 3.

On an average, 3 cc. of glucose solution were required with each specimen.

¹ It is probable that many manufacturers would change places were different specimens to be examined. In the absence of an alkaloidal standard, this series of investigations can only be considered in the light of a systematic study.

TABLE IX.

	No. 1. Crude Alkaloid from 5 cc. Per Cent.	No. 2. Dry Extract from 5 cc. Per Cent.	No. 3. Chloroform Extract from 5 cc. Alkaloid and Fat. Per Cent.
A,	2'56	15'15	4'34
B,	2'47	12'05	4'85
C,	2'09	9'90	3'10
D,	1'86	9'90	2'74
E,	1'86	9'45	2'40
F,	1'70	10'00	3'22
G,	1'63	11'20	3'44
H,	1'62	8'70	2'36
I,	1'60	13'04	2'96
J,	1'02	6'90	2'38
K,	0'93	5'70	1'80
L,	0'72	5'60	1'46
M,	0'60	14'07	2'28
Average,	1'59	10'13	2'87

Alkaloidal Valuation.—From the foregoing residues (column No. 3) the alkaloid was abstracted according to the second part of the formula (p. 339), and the alkaloidal residues obtained therefrom exposed six hours to a temperature of 140° F. in the drying room, and weighed after they had been cooled in a desiccator. These weights multiplied by 20 gave the total alkaloidal percentages as shown by column No 1.

Remarks.—The most striking lessons that may be learned from this table, is, perhaps, the fact that, so far as the commercial fluid extracts of *nux vomica* are concerned, there is no apparent relationship between alkaloidal and total extractive proportions. If the basis of energy of fluid extract of *nux vomica* is to be estimated from its proportion of natural alkaloid, it is useless to attempt to affiliate total extractives, for they do not correspond at all. In this line of examinations the *extremes* in alkaloidal valuation were first and second in the extractive column. Scarcely nearer relationships seem to exist in the proportions between the chloroformic extracts (column 3), and their respective alkaloids. However, both the members of column 2 and column 3, considered respectively, vary less among themselves than those of column 1, for in neither is the difference between the extremes much more than 3 to 1, while in column 1 (alkaloids) the difference is more than 4 to 1.

In a former paper¹ the author suggested that fluid extract of *nux vomica* might be standardized at 1.50 per cent. of natural alkaloids, and it will be observed that the average of this series of determinations makes it 1.59. Nine of the samples exceeded that valuation (1.50), thus establishing the fact that should the pharmacopœia require, a higher standard could be accepted or at least attained by manufacturers.

Of the thirteen specimens examined, one only contained a statement on the label concerning its alkaloidal extractive value. A, of the list, stated that the alkaloidal percentage was 2.36 per cent., and the extractive 13.8 per cent. For this reason, this specimen was selected for further consideration.

(9) *Total Extractive (Variation) of Specimen A.*—The maker of this specimen established on the label the extractive valuation of 13.8 per cent. Careful investigations demonstrated that in our hands, as conditions varied, the extractive might range from 11.95 to 15.35 per cent.

By measure, 2.5 cc. evaporated in the drying room at 140° F. and then exposed for four hours, left 0.322 gm. of residue which in twelve hours was reduced to 0.309 gm.

One gm. evaporated in a large flat bottomed dish on a steam bath left 15.35 per cent., and then exposed in a dry-room for one hour left 15.1 per cent., and after six hours' exposure with occasional stirring, 11.95 per cent. remained. This residue submitted to open laboratory air for ten minutes increased to 12.95 per cent., and still continued to increase. An average of the results is 13.84 per cent. which is remarkably near the valuation (13.8 per cent.) of the manufacturer. However, it will be observed that under conditions that might be considered unimportant, the same residue altered materially in weight, enough to cause considerable discrepancies in different assaying reports, were different operators not working under exactly similar conditions. In my opinion allowances for such disturbances must be made in these lines of observation, and exact comparisons cannot be consistently drawn unless details often unmentioned by operators are recorded. That extremely close work is unnecessary, however, at this date, will probably be accepted, if any galenicals are standardized, for even approximate alkaloidal requirements (see

¹ Proceedings Am. Pharm. Assoc., 1891, p. 129.

our Table IX) will be improvements in many products that result from the present process of manufacture

(10) *Natural Alkaloid of Specimen A*—The maker of this specimen (A of the list) gave the "total alkaloid" valuation as 2.36 per cent. by gravimetric assay, which, being the only commercial sample thus standardized, was selected for comparative assay.

Three assays were made of 5 cc. each for chloroformic residues, according to the first part of the process, the evaporations being made spontaneously, the several residues being exposed for four hours in a drying room at 140° F.

TABLE X.

No. 1	gave	4.66	per cent.	chloroformic	extract.
" 2 "		4.30	"	"	"
" 3 "		4.16	"	"	"

In making these determinations, the first was abstracted with three portions of chloroform of 10 cc. each. The second with three portions, one of 10 cc. followed by two of 5 cc. each. The third was abstracted with one portion of 15 cc.

It will be seen that the first gave the best result and supports the rule previously evolved, viz: that to obtain the entire chloroformic extract (fats and alkaloid) the abstraction should be made with at least three parts of chloroform of 10 cc. each. (If a mortar is used, increase the chloroform.)

From these residues the alkaloid was purified in the usual manner (see process, p. 339), and after the evaporation of the chloroform of the rotations, by exposure to the drying-room, was subsequently exposed to 140° F. for four hours.

TABLE XI.

First	experiment	gave	2.60	per cent.	alkaloid.
Second	"	"	2.48	"	"
Third	"	"	2.50	"	"
Fourth	(third repeated)	experiment	gave	2.52	per cent. alkaloid.

These results were accepted as demonstrating (supporting previous investigations) that, in order to abstract all the alkaloid, three chloroformic washings of the magma with 10 cc. each were required, and, that this was sufficient, was evident, for the remaining magma gave no evidence of alkaloidal reaction, and was not perceptibly bitter to the taste (see p. 344), and it is not probable that a richer commercial fluid extract than this specimen will often

present itself. It is seen that each assay gave a higher average than the manufacturer had established, and every precaution was taken to reduce the residues to constant weight. That the maker slightly under-estimated (preferring probably to understate rather than overdraw) its alkaloidal value seems therefore evident from this series of investigations, which were partly experimental and not designed to establish the highest possible results, and to which may be added the product with specimen A (Table IX), in which the alkaloidal percentage was 2.56 per cent. The average percentage, as shown by five assays, was 2.53 per cent. The difference (0.17 per cent.) between this amount and the valuation stated by the manufacturer being closer than might be expected, considering that the details of methods may have been different, and the conditions of residue exposure such as to lead to unavoidable variations.

(11) *Time Consumed in the Assay.*—(A) The abstraction of the iron magma by means of the mechanical mixer requires five minutes.

(B) The evaporation of the chloroform, if a deep beaker is used, and a steam or water-bath, will be nearly accomplished during the abstraction of the magma A. The several portions of chloroform should be decanted into the beaker successively and the two operations (A and B) may be completed in ten minutes.

(C) The washing of the fatty residue and filtration of the acid solutions will take about ten minutes.¹

(D) The rotations of the aqueous solution of the alkaloid with chloroform require ten minutes.

(E) The evaporation of the alkaloidal chloroform in a deep beaker on a water or steam-bath should be accomplished in a couple of minutes after the last chloroform (D) has been abstracted from the rotator, for these two operations should progress simultaneously, one portion of chloroform being evaporated while the succeeding rotation is being made.

(F) The final exposure of the residue, in my opinion, if the temperature ranges from 140° F. to 175° F., should not require more than fifteen minutes to bring it to a brittle glass-like condition when cold. Total, forty-five minutes.

¹ If, as seems to me desirable, one portion of chloroform (15 cc.) be used to abstract the iron magma A, and one portion of 15 cc. to rotate the aqueous solution D, the time will be much reduced.

LAUDANUM ASSAY.

BY FRANK X. MOERK, PH.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.
No. III.

Objection has repeatedly been made to the U. S. Pharmacopœia process for the assay of opium that it is not applicable to the assay of opium preparations. In the following the writer gives a method that has been very satisfactory in his hands in the assay of laudanum and it can no doubt be used for other preparations. While 70 grams of the laudanum sample in a tared capsule are being slowly evaporated to a syrupy consistence on a water-bath (the water being kept below the boiling point), 2 to 3 grams of the sample are evaporated on a watch-crystal or in a small beaker, so as to ascertain the amount of total solids (this figure should be close to 60 per cent.); it is important to make the syrupy liquid spread over as much surface as possible to facilitate the drying which is completed at a temperature of from 100–105° C. Calculation is then made to find the total solids in the 70 grams taken for the assay; the syrupy liquid from the 70 grams is then made up by adding water to a weight obtained by adding the total solids to 10 gms (10 cc. water). (It has been found easier in the U. S. P. process to thoroughly incorporate the opium and lime with 10 cc. water than with 20 cc., hence the above change). 3 grams slaked lime are then added to the contents of the capsule and thoroughly stirred with a pestle until a uniform mixture results; by the gradual addition of the remaining 60 cc. water this mixture is rinsed into a flask or beaker and then frequently shaken or stirred during one-half hour. After filtering 50 cc. of the filtrate are mixed with 5 cc. alcohol and 25 cc. stronger ether, and after thorough agitation 3 grams ammonium chloride are added and the U. S. P. directions further followed. In pouring the mixture from the capsule into another vessel a little petrolatum applied to the lip of the capsule will prevent the liquid from running down the outside. Another point in the assay of opium that has been found to help in obtaining uniform results was the drying of the slaked lime at a temperature not above 100° C. to free the slaked lime from excess of moisture; to do this the lime was slaked in a beaker and covered with a watch-crystal, it was then dried until moisture no longer showed itself on the lower side of the watch-crystal.

EXAMINATIONS BY BOARDS OF PHARMACY.

BY JOSEPH P. REMINGTON.

Read before the Pennsylvania Pharmaceutical Association, June 16.

Query 2.—What should be the true aim of Boards of Pharmacy in their examinations; and what should be the nature of the questions put?

These queries, for there are really two here, have been placed in my hands by the Committee for reply. It will be readily observed that if they can be satisfactorily answered and the laws executed that many of the perplexities of State Boards will disappear and the very desirable condition of pharmacy laws fulfilling the expectations of their promoters will be experienced.

To the first query, "What should be the true aim of Boards of Pharmacy in their examinations?" the answer is: (1) To pass the qualified candidates; and (2) to reject those who are unfit to be licensed; and in the writer's opinion no other answer can be given. The true aim of Pharmacy Boards having been easily settled, the second query is encountered, and here the real difficulties are presented. "What should be the nature of the questions put?" Constructive ability is of a far higher grade of merit than that which is destructive; and, it is always easier to pick out flaws in questions, than it is to frame a set which will be thoroughly satisfactory.

The first answer to this question must be, "The nature of the questions put" must be such as will determine the candidate's fitness to have the license, and now the answer must broaden out so that it may cover the subject. An experience of twenty years in framing questions in pharmacy has possibly given the writer some qualifications to answer this question. In the first place, it becomes of the utmost importance for any examiner, no matter what class of candidates are before him, to divest himself of all idea of "getting up a lot of stumbers" or of framing the questions so that they may become pitfalls to the unwary. Every examining body should be held responsible for the character of the questions asked. Pharmacy Boards are unquestionably invested by the State laws with great powers. At their "ipse dixit" they may say to a young man, "Stand down," and down he goes and great is the fall; or if they say, "Come up higher, brother," the candidate is elevated and happiness is his portion.

With many of the Boards the questions asked are never published, and the candidate has no method of knowing how many of the questions have been satisfactorily answered. With some of the Boards, one set of questions serves for all of the candidates; if a certain proportion of the questions are answered, he can reach the mark set for assistants; if a larger quantity of the same questions are properly answered, he is entitled to rank as a proprietor.

Whether this method of determining a man's fitness has the only merit of economy, must be a matter of individual opinion. The writer has carefully examined many of the Boards of Pharmacy questions that have been published, and it must be said that the questions have mainly followed the methods adopted by the colleges of pharmacy; a number of the questions being recognized as having done duty before at a college examination. There cannot be any great objection to this, provided the questions selected are suitable; and this brings up the main question, what is a suitable question to give a candidate?

In the writer's opinion, the questions should be graded. To the candidate for the assistant's certificate, the questions should be mainly directed towards proving whether he is a safe person to be left in charge of the store during the temporary absence of the proprietor; for the certificate that he is given qualifies him in this respect. There are many questions which would be perfectly proper to give a junior student at a pharmaceutical college that are theoretical, and which presuppose him to have a knowledge of physics, mathematics or chemical reactions; for the junior student has just listened to lectures treating of these subjects and the college examination is for the purpose of showing how much of the lecture or instruction has been retained. But, many of these questions would be totally unfit to give a candidate for the assistant's certificate. The College as an institution has the right to ask of her students a certain grade of accomplishments, based upon the instruction given, before permitting the student to pass to a higher class; a grounding in elementary physics and botany, and pharmaceutical mathematics is essential in order to thoroughly comprehend the subjects which are to follow. But the questions which should be given to candidates for the assistant's certificate should be eminently practical. The doses of poisonous remedies, and indeed of all remedies, should form a prominent part of the examination. The relative

strengths and characters of the classes of the pharmaceutical preparations form valuable subjects from which to select questions. Candidates should be drilled on the official names of the preparations, with the English names and synonyms.

In chemistry, the physical and chemical properties of the substances used as medicines form an inexhaustible field for suitable questions. The effects produced by mingling various chemical drugs furnish another source for important queries. Practical familiarity with the subjects should be shown by the recognition of specimens.

For the proprietor's examination, a much higher standard should be fixed. The ability to decipher prescriptions, not only those which are fairly well written, but ones which are difficult, should be a part of the examination. The proprietor should be posted upon properties, doses and physical appearances of official medicines; and he should know at least the doses and properties of the new popular remedies.

Finally, it is not too much to expect the proprietor to show his ability to carry on business by passing a practical examination before the Board, where his competency to perform the duties for which he is given a special license can be demonstrated thoroughly, in the presence of the body which gives him his authority.

AN ESSAY ON SPICES.

BY CHARLES A. HEINITSH.

Read before the Pennsylvania Pharmaceutical Association, June 16.

An essay on the Selection of Spices, asked for by the Association and assigned to the writer, is, or may be considered, an evidence that the sale of spices is a legitimate part, or a legitimate adjunct to a drug store, and particularly to those who aim to supply demands, with the very best articles of the kind obtainable, that are asked for and needed in families.

The innovations of several kinds of business, as grocers, merchandise stores, etc., of keeping so many articles that are the prerogative of a drug store, and so much having been published in the journals and newspapers of the day, about the inferiority and the adulteration of spices sold in open market by manufacturers, grocers, merchandise stores, etc., makes *now* an opportune time *for us*

to fill the want existing in every community. I mean the supplying the best quality of every spice that is wanted, *and this can be done*. All that is required is to know where they are—then select them—and pay a price commensurate with the quality. Quality, not price buyers, we should be. Cupidity for gain must not be considered or allowed.

Spices of high grade are not cheap, but cheapest to the consumer by reason of their excess of flavor, and are more remunerative, for they command better prices, and for the reputation that ensues to the seller.

Here let me emphasize that *purity* means nothing, unless fine quality of whole goods are used in grinding; it is simply a question of how much essential oil and aromatic properties are contained in the crude article; it is *these properties* that make a good article effectual.

The manner and substances used in falsifying and adulterating spices the literature of the day exposes—for that we have no use, unless to learn the tricks—and how to prevent or avoid them.

The assigned subject, the Selection of Spices, suggests that varieties are numerous, *which* and *what* are the best to select from, and keep for sale.

At the present time the plantation or cultivated spices, grown on the Penang or Prince of Wales Islands, lying at the mouth of the Straits of Malacca, such as cloves, nutmegs, mace, etc., are the finest; these are selected at the place of their growth, and afterwards hand picked in London, except cloves, which are cultivated in a distinct class, from finest Penang to commercial Zanzibar, the Amboyna and Bencoolen being intermediate grades.

The *Nutmegs* are unlimed and very large, from 50 to 60 to a pound, rich in oil, and possess a fine, delicate aroma of great flavoring strength.

The *Mace* has the bright, orange yellow color, rich in fixed oil and aroma, the arils being very perfect, evidently being taken off the nuts with much care.

Peppers, the Malabar, Singapore and Tellicherry, black and white, full developed, heavy fruit, well cleansed by sifting and washing, and known as shot pepper, possess the greatest amount of pungency and fine aroma; also the largest amount of piperine and oil.

The Malabar black [a sample exhibited] is a special production,

but expensive; most of this is used in Russia and Germany; the ground Malabar is of an exceptionally fine flavor and pungency; it is now imported into Philadelphia.

Piper longum or *Long Pepper* is a variety that is not frequently called for, except during the fall season for pickling vegetables.

Capsicum.—Several varieties of Cayenne or Red Peppers are grown. The African or bird's-eye coming through the port of Natal, on the west coast of Africa, is unequalled for pungency, fine aroma and the amount of capsacin; this kind is best also for making tincture and fluid extract; the retention of its fine properties is attributed to its being fined, not by grinding, but by cutting knives.

Pimento, Allspice.—Jamaica is the principal source of supply and grows the finest quality; large and small fruits are in the market and generally well cleansed, the small well developed is richer in oil and possesses the fine pungent aromatic odor.

Gingers.—The Jamaica, Cochin-China bleached and unbleached are used more for medicinal than culinary purposes; the rhizome of the African in its natural state is the kind wanted and used in families, and should be selected for its plumpness and weight. It is now conceded that rhizomes cultivated at the Missions, and by other special growers, possess a finer aroma and strength than the wild or East India ginger.

Curcumas we are familiar with; both the long and round are used, but the bright yellow powder is usually preferred for pickling and curry.

Mustards, known as yellow and brown, are obtainable everywhere, colored and uncolored; the fine blends of English and Trieste, or Kentucky grown seed, are *the desirable ones*, and equal to any foreign brands of English, Russian or German. The coloring usually added, when not in excess, does not affect its taste and is not considered an adulterant, but added to make it more sightly, as we add saunders and cochineal coloring to tinctures and elixirs.

The *Cassia*, commonly called *Cinnamon*, known as Saigon, coming from Cochin-China, and particularly the thin quill bark selected from the twigs and smaller branches, known in trade as Java cassia, possesses a different and superior aroma and strength to the ordinary Chinese, though the young thin bark of this variety of bright color, and free from spots of decay, is the kind to select from to supply a trade demand for a lower price article.

Ceylon cinnamon, being rarely called for other than for medicinal purposes, is not considered.

The above are the principal spices, commonly used in families and what the writer supposes No. 6 of the *Queries* calls for.

Samples of cloves, cassia, mace, nutmegs, peppers, etc., are submitted for inspection.

COMPRESSED TABLETS AND TABLET TRITURATES.

BY JOHN H. HAHN, Ph.G.

Read before the Pennsylvania Pharmaceutical Association, June 16.

Compressed tablets and tablet triturates have become very popular of late years, for the purpose of administering drugs formerly prescribed in pilular form, and for preparing accurate solutions for medication; they have almost entirely superseded the old form of medicated lozenges. The increased popularity of this class of preparations may be judged from the fact that in 1888 one per cent., and in 1891 two per cent. of the original prescriptions compounded in a certain store in Philadelphia were for compressed tablets.

The question has been often asked: Does it pay the retail druggist to manufacture compressed goods? This is a very difficult question to decide satisfactorily to all; for there are many who believe the work so laborious and difficult, and their time so valuable that they cannot afford to make them in such quantities as they may require to supply their demands.

While the above statements may be partly true, they are not by any means conclusive; for the practical experience which the writer has had in this particular branch of the profession, has led him to believe that it does pay, both directly and indirectly; and it is also his belief that a tablet compressor will be as necessary in the near future, as a pill machine or tile has been in the past, in order to keep abreast with the advancement of your chosen calling.

A practical illustration of how it pays was brought to the writer's notice some time ago, by a druggist in Philadelphia, who had received a prescription about the first week in January of the present year, for twenty compressed tablets of cocaine hydrochloride of $\frac{1}{8}$ grain each. The doctor not having specified any particular make, it was optional with the druggist whether he made them or

purchased them from some one of the manufacturers. Of the two privileges he chose the latter, and thereby was compelled to buy an original package of 100 tablets at a cost of \$1.08, and 10 cents for car fare, making \$1.18. Twenty of them were dispensed, and the balance still remain in stock, and while tablets of different strengths have been called for, these have not been. Such cases as the above will be frequent; but by being prepared to do your own compressing, you will not only obviate the necessity of carrying a large and unnecessary stock, but will be able to serve your patrons with greater despatch, which is oftentimes quite an advertisement.

The secret of success depends entirely upon having the powders properly prepared, before subjecting them to compression; if you will therefore follow the directions as laid down in Remington's Practice of Pharmacy, together with a little practical experience, you cannot but help to meet with good results. For hypodermic tablets, Dr. H. A. Wilson, of Philadelphia, recommends the use of chloride of sodium as a base, as being less irritant than other substances; but for sulphate of morphine sulphate of sodium, and for acetate of morphine, acetate of sodium should be used.

It is very necessary to keep your compressor in a clean and thoroughly good condition. For this purpose have a chamois skin greased at one end with vaselin, and the piston and barrel should be well rubbed before and after using. It should also be borne in mind that too great pressure should not be used.

Compressed tablets and tablet triturates have every advantage over the pilular form of medicine, and from the fact of their not containing an excipient, which might cause a chemical change, they can be relied upon by the physician with greater certainty, as compared to gelatin or other coated pills.

INFUSION OF DIGITALIS.

BY JOSEPH W. ENGLAND, Ph.G.

Read before the Pennsylvania Pharmaceutical Association, June 16.

At the Scranton meeting of the Association in 1889, I had the pleasure of presenting a paper upon the above subject, and wish now to supplement the facts then given, with further information. In the study of the galenical preparations of a plant, the study of the plant's proximate principles, active and inactive, is the road through

which the best results are obtained. The so-called active principles of digitalis are very numerous, and it is now accepted that many of them are decomposition products—products which have been the result of decomposition of the truly active principles in the plant during plant-life, by the plant acids and saline compounds, as claimed by Kosmann, and products which have been the result of decomposition by reagents, during plant exhaustion and after treatment of extract. The results of the later analyses all show this.

The name digitalin has been given to a number of products, but is now generally reserved for the compound obtained by Schmiedeberg (1874), with which Kosmann's insoluble digitalin is supposed to be identical. It has also been established that the other digitalins, whether crystallized or amorphous, are varying mixtures of Schmiedeberg's digitalin, digitoxin, digitonin, digitalein, and decomposition products. Of these compounds, all, save digitoxin, are glucosides. Including the decomposition products, they may be grouped in two classes, according to solubility. First, those soluble in alcohol and insoluble or almost insoluble in water; second, those soluble in both alcohol and water. Digitoxin and digitalin belong to the first group, and digitonin and digitalein belong to the second group. Hence, it will be seen, that the tincture and fluid extract contain, most largely, digitoxin and digitalin, with some digitonin and digitalein, whilst the infusion contains digitonin and digitalein, with no digitoxin or digitalin. This explains the difference in therapeutical action between the two preparations.

In the paper on infusion of digitalis, previously referred to, it was shown that cold-water maceration was preferable to hot-water maceration, in that less coloring matter and more of the colorless active principles were dissolved; that the toxicity of digitalis very notably diminished when the product of maceration was concentrated by a water-bath; that the English leaves were superior to the German only because the commercial samples of the former were carefully selected and freed from the stalks, thereby reducing the element of variability to a minimum; that the use of cinnamon in the official infusion was objectionable because its presence exerted a retarding influence upon the solution of the water-soluble principles, and that, for the usual quantities of infusion made, one hour's maceration, with occasional agitation, was all sufficient. A formula for making the infusion was presented.

Since that time, my experiments have led me to modify the original formula, but none of the then expressed views. These modifications consist simply in the addition of a small quantity of ammonia water, and a reduction of one-third of the amount of alcohol ordered.

Before considering the new formula let us consider, briefly, a number of changes which the official infusion undergoes when subjected to certain reagents. The freshly made infusion is weakly acid in reaction, and requires the immersion of the litmus paper for a moment before the change becomes evident. The tincture, however, shows the acid reaction more promptly, owing probably to a greater solubility of the acid or acids in alcohol. The amber color of the infusion darkens immediately on the addition of ammonium hydrate, and deepens in color until it becomes a dark red brown, almost green by refracted light. The ammoniated infusion does not decompose until the excess of ammonia has volatilized. This, as a rule, takes some time, especially if the container be well corked. I had, until recently, a sample which had remained permanent for nearly two years before decomposition commenced. If the excess of ammonium hydrate be driven off by heat, the infusion becomes, on the addition of hydrochloric acid, a light reddish orange.

Tannin added to the plain infusion shows no change (absence of digitalin). Fehling's solution gives a deep green color, and in boiling yields a reddish precipitate. Silver nitrate solution, on boiling, is reduced to oxide. Lead oxyacetate solution gives a greenish-yellow precipitate, and the reaction of the infusion ceases to be acid, showing that the acid or acids present form insoluble lead salts. Ferric chloride solution gives a deep green color which, on heating, becomes brown, and on cooling precipitates a dull greenish precipitate; a dark green color is likewise yielded with ferroso-ferric salts. Lead acetate gives a greenish yellow precipitate soluble in acetic acid, which does not turn red on exposure to air (absence of catechin¹). Aluminated gelatin has no precipitating effect, nor have alkaloidal solutions (absence of tannin). A drop of tincture of ferric chloride colors the infusion a deep green, and on the further addition of a drop or two of diluted ammonia water, the green color changes to a deep red brown. This reaction is quite characteristic.

¹ Dragendorff's Plant Analysis, p. 138 and p. 36.

The revised formula is as follows:

Take of Digitalis leaves, bruised,	120 grains.
Water,	14½ fluidounces.
Ammonia water,	90 minims.
Alcohol,	1 fluidounce.

Macerate for an hour, agitating well occasionally, filter, express residue, wash with water, and filter, to make 14½ fluidounces. Now, add 90 minims of ammonia water, 1 fluidounce of alcohol, and sufficient water to make the volume measure 1 pint.

This formula has been used for nearly three years past, and frequent inquiries of physicians, as to the medical value of the product, have always elicited commendation. Further, Dr. H. C. Wood, Professor of Materia Medica and Therapeutics in the University of Pennsylvania, writes me that there can be no therapeutical objections to the use of ammonia water in the quantity and manner described. If the formula should be generally adopted, however, the markedly different appearance of the product from that of the official formula should be pointed out to physicians. The infusion is of a dark red brown color by transmitted light, and greenish black by refracted light.

The official product usually decomposes in three or four days, precipitating. With the ammoniated product, however, there is no change in three or four weeks and longer. At the same time it is always best to make the product extemporaneously. It may be that the ammonia water exerts its preservative influence by neutralizing the free fatty acids in digitalis. There are a number of acids present in digitalis leaves—the antirrhinic acid of Morin (1845), and the digitoleic acid of Kosmann, with which the digitaloic acid of Walz is probably identical. The percentage of fixed oil in digitalis is relatively high. I was surprised to obtain in 1887 about 5 per cent. A sample is here exhibited. Its reaction now is quite acid. Its reaction when first obtained was not observed.

The oil in question was obtained from Allen's digitalis leaves by petroleum benzin extraction and spontaneous evaporation, in January, 1887. The oil, or rather mixture, as there is evidently present both a volatile portion and a fixed oil, is a dark red brown transparent liquid of a heavy, persistent narcotic odor. It is largely soluble in alcohol, freely soluble in ether or chloroform, and is non-inflammable (showing absence of traces of petroleum benzin). It

leaves a permanent greasy stain on bibulous paper. Its specific gravity is about 0.850. Heated for eight hours at 200–212° F. it lost 5.4 per cent., and also lost its peculiar narcotic odor, becoming more fatty in character. This indicates that the volatile portion lost is the odorous portion.

ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

Distilled tarwater is stated by Cornéille St. Marc (*Poit. Médical*, 1892, No. 3) to rapidly arrest various forms of hæmoptysis and metrorrhagia, and to be useful in mucous metritis; but its action is uncertain in uterine carcinoma and fibromyoma.

A concentrated solution of boric acid is prepared by Mr. Puaux (*Jour. Phar. Chim.*, Feb., 1892), by using boric acid, 200 gm.; magnesium carbonate 35 gm. and water 1,000 cc. The solution has the specific gravity 1.088, is acid to test paper, and contains one-sixth of its weight of boric acid. (See also *Amer. Jour. of Phar.*, 1892, p. 99.)

Calcium salts for therapeutic use.—According to G. Sée (*Méd. mod.*, March, 1892, p. 137) the calcium preparations usually employed in medicine are uncertain in their action because they are absorbed only in minute quantities, a small proportion being eliminated through the kidneys, while nearly the entire quantity passes through the intestines and is rejected without having produced any action. *Calcium iodide* and *calcium bromide* are the salts particularly adapted for introducing iodine and bromine into the organism, the proportion of these elements being greater than in any other medicinal salt. On the other hand, these calcium salts have neither the frequently unpleasant activity of the corresponding potassium salts nor the inertia of the sodium salts. *Calcium chloride* and *bromide* are adapted for use in a large number of dyspepsias and stomachal lesions. *Calcium iodide*, given in small doses, does not in the least derange the digestive organs, otherwise it agrees with the potassium salt in the favorable action upon the respiration, the heart and upon specific diseases.

Calcium tartromalate has been isolated by C. Ordonneau (*Bull. Soc. Chim.*, 3 sér., vi, 261) from the juice of green grapes, and from wine prepared from grapes attacked by mildew. It is a double salt

of left rotating calcium tartrate and right rotating calcium malate, of the formula $\text{CaC}_4\text{H}_4\text{O}_6$, $\text{CaC}_4\text{H}_4\text{O}_5 + \text{CH}_2\text{O}$, and on being treated with sufficient sulphuric acid, yields tartromalic acid, in deliquescent crystals. Some white wines were found to contain a considerable amount of malic acid; this acid gradually disappears in the grapes as they ripen.

Analysis of lead chromate—Chrome yellow, 2 gm., is well shaken with binormal potassa solution, 20 cc., until decomposition has been effected, basic lead chromate and potassium chromate being formed according to the equation $2\text{PbCrO}_4 + 2\text{KHO} = \text{PbCrO}_4 \cdot \text{PbO} + \text{K}_2\text{CrO}_4 + \text{H}_2\text{O}$. The mixture is then diluted with water, the liquid decanted, and the excess of alkali determined with normal sulphuric acid, phenolphthalein being used as an indicator; the amount of lead chromate is calculated from the difference of the alkali as above indicated.—Lachaud and Lepierre, in *Bull. Soc. Chim.*, 3 sér., vi, 235.

Lepidium sativum and *Raphanus sativus* have been grown by P. Lesage and watered with solution of sodium chloride. Such plants produced modifications closely analogous to those observed in the same plants growing near the sea coast, and the stems and roots contained considerable amounts of table salt.—*Compt. rend.*, cxiv, 143.

Nitro-antipyrine has been prepared by E. Jandrier (*Compt. rend.*, cxiv, 303), by dissolving antipyrine in 10 parts of concentrated sulphuric acid, adding drop by drop $\frac{3}{4}$ part of nitric acid, spec. grav. 1.35, and pouring the mixture into cold water; the precipitate, crystallized from boiling acetic acid, forms straw-yellow needles, which melt at 260°C. , and are slightly soluble in alcohol, but insoluble in cold water.

Daturic acid.—E. Gérard has studied the salts of this acid, obtained by him from stramonium seed. (See *Am. Jour. Phar.*, 1890, p. 493.) The normal alkali salts are crystalline, soluble in a small quantity of hot water, precipitated from the solution by table salt, and decomposed by much water with the production of a crystallizable acid salt. The copper and silver salts crystallize from hot alcohol, but are insoluble in water and ether. The lead salt is amorphous and only sparingly soluble in hot alcohol or boiling ether. The acid yields an uncrystallizable bromo derivative $\text{C}_{17}\text{H}_{33}\text{BrO}_7$. On distilling daturic acid over lime daturone $\text{C}_{33}\text{H}_{66}\text{O}$ is obtained,

which crystallizes in pearly spangles from hot alcohol, and these melt at 76° C.—*Four. Phar. Chim.*, 1892, 8.

The Oil of Mentha Pulegium, Linné, according to P. Barbier (*Compt. rend.*, cxiv, 126), contains as its chief constituent *puleone*, $C_{10}H_{16}O$, which has a strong mint-like odor, and at 23° C. the spec. grav. 0.9293, boils at 222°, is dextrogyre, and by chromic acid is oxidized to carbonic and acetic acids and silky needles of $C_7H_{12}O_4$, which are probably identical with propylsuccinic acid. Puleone is energetically acted upon by bromine with the evolution of HBr. It combines with hydroxylamine yielding colorless *puleonoxime* $C_{10}H_{16}NOH$, having a strong odor and boiling at 170° C.

The dose of digitalis for the abortive treatment of pneumonia is from 4 to 8 grams of the leaves, given in the form of infusion during twenty-four hours, according to Professor Petresco of Bukharest (*Bull. gén. Thér.*, Paris, Feb., 1892, p. 120). The author states that the tolerance and the non-toxicity of such large doses are proved by observations on 755 cases as published in his *Traité de thérapeutique* in 1884, and in a number of theses sustained before the medical faculty at Bukharest.

Physiological action of kola nut.—After considering all the arguments and weighing the evidence produced in favor of each, Combemale (*Bulletin gén. Thérap.*, Feb., 1892) arrives at the conclusion that Professor Sée's view is the correct one, that the action of kola in counteracting the sensation of fatigue depends solely upon the caffeine, of which kola contains two or three times the proportion of that met with in coffee; and that this also explains the success of kola in the treatment of diseases of the heart and in the renovation of strength during convalescence or following intellectual or physical over-exertion. The favorable effects of kola in diarrhoea are due to the tannin present in the drug. (See also *Amer. Jour. Phar.*, 1892, pp. 79, 191, 230.)

Effects of cocaine.—The frequent and continued use of cocaine upon the nasal mucous membrane, according to Dr. Seifert (*Rev. laryngol.*, 1892, No. 6), produces a local paralysis and hypertrophy of the mucous membrane; in addition to these, general effects are noticed, like inability for intellectual work, insomnia and palpitation of the heart. These symptoms improve rapidly after the cessation of the medicament.

The anæsthetic properties of cocaine disappear, according to A. Bignon (*Bull. gén. Thérap.*, Feb., 1892, 170), and remain latent in acid solution, but reappear on neutralizing the free acid, and attain their maximum intensity upon rendering the liquid slightly alkaline. The author prefers the use of what he calls *milk of cocaine*, which is prepared by dissolving the hydrochloride or other salt of cocaine, and adding a very slight excess of sodium carbonate.

GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, PH.G.

Glycerin Suppositories.—A. Thumann states that when these were first prescribed, they were intended to be made of glycerin and cacao-butter, but owing to the belief of some pharmacists that the two were not miscible the numerous recipes followed in which soap, gelatin and other substances were incorporated. For a number of years he has made a desirable product which melts at the temperature of the body and keeps without change. The cacao-butter is melted at 32–35° and agitated in a prescription vial with an equal weight of glycerin also warmed until the mixture begins to solidify when it is poured into paper moulds.—*Journal der Pharm. v. Elsass-Lothringen*, 1892, 121.

Epidermin.—Under this name a surgical dressing which, by evaporation, leaves an elastic film is introduced; a similar preparation is made by melting 15 parts white wax and triturating in a warm iron mortar with 15 parts powdered acacia until a uniform mass results; to this is then added a boiling mixture of 15 parts each distilled water and glycerin and the mixture stirred until cold. Any medicinal agent to be incorporated with epidermin should be rubbed up with glycerin.—*Oesterr. Ztschr. f. Pharm.*, 1892, 271.

Atomic weight of copper.—Thos. W. Richards, from two series of investigations, concludes that the atomic weight should be somewhat higher than the figure accepted at the present time and finds it to be 63.604 (O=16) or 63.44 (O=15.96).—(*Ztschr. anorgan. Chem.*) *Chem. Ztg. Repert.*, 1892, 165.

Saprol, also called *disinfection-oil*, consists of a mixture of crude cresols containing considerable quantities of pyridine bases and hydrocarbons which presumably are obtained from a petroleum refinery

the addition of hydrocarbons is such that a mixture results which floats upon water.—*Pharm. Centralhalle*, 1892, 305.

Solubility of sulphur in alcohol.—At the boiling point 265 parts alcohol will dissolve one part sulphur; after filtering the solution remains clear, unless agitated, for at least four hours, after which time the excess of sulphur commences to separate, this being complete in about 30 hours; 3,300 parts alcohol at ordinary temperature will then contain dissolved only one part sulphur.—Dr. C. Schierholz, *Pharm. Post*, 1892, 573.

Grindelia robusta.—After reviewing the various analyses published (*Am. Jour. Phar.*, 1888, 433 and 440), Dr. A. Schneegans records results obtained in examining the saponin and in testing for alkaloids. Two kilos of the dry drug, finely cut, were repeatedly boiled with water, the decoctions mixed, allowed to cool and filtered; the filtrate was precipitated with an excess of *neutral* lead acetate, the precipitate collected, washed with a dilute lead acetate solution until the washings ceased to give a precipitate with *basic* lead acetate, and then suspended in water, decomposed by dilute sulphuric acid and the excess of this at once neutralized by addition of lead carbonate. After filtering, the liquid evaporated, left a small quantity of a brown, resinous mass, which was soluble in great part in boiling, dilute alcohol; the addition of three volumes of chloroform to this solution caused a voluminous precipitate; the precipitation was made complete by adding ether to the filtrate, and the precipitate further purified by solution in alcohol and precipitation with ether. Dried over sulphuric acid the precipitate formed a yellowish powder, easily soluble in water and dilute alcohol but almost insoluble in absolute alcohol; the aqueous solution has an acid reaction, foams upon agitation, and reduces Fehling's solution after boiling with acid; lead acetate forms a yellow precipitate soluble in acetic acid; concentrated sulphuric acid dissolves the powder with reddish, yellow color, which upon heating becomes deep red; ammonia, nitric and hydrochloric acid dissolve it with a yellow color.

The filtrate from the lead acetate precipitation was concentrated, filtered and precipitated with *basic* lead acetate, the precipitate being washed and decomposed as above. The aqueous solution of the precipitate was then treated with *neutral* lead acetate to remove the last portions of the substance already described, the filtrate

evaporated to dryness and exhausted with alcohol; this solution gave a precipitate upon addition of ether which after purification and drying formed an almost colorless powder easily soluble in water and dilute alcohol, forming slightly acid solutions; it reduces Fehling's solution after boiling with acid, is precipitated by *basic* but not by *neutral* lead acetate. The *saponin* present, therefore, is made up of *two glucosides*, differing from the saponin isolated by Kobert from senega and quillaja in but one respect, namely, a slightly acid reaction of the one precipitated by basic lead acetate. [The filtrate from the basic lead acetate precipitation was made alkaline with soda, extracted with ether, and the thick, brown, alkaline liquid purified by solution in acid, washing with ether, again liberating by soda. The aqueous solution of the substance gives precipitates with phosphomolybdic acid, Mayer's reagent, potassium tri-iodide, tannin, etc., but the quantity of the substance present in the drug is so slight that it appears venturesome at present to speak of an alkaloid in *grindelia robusta*.—*Fourn. d. Pharm. Elsass-Lothringen*, 1892, 133.

Adulterated sodium salicylate.—J. E. Gerock recently came in possession of a sample of sodium salicylate, the red color of which was corrected by the addition of a quantity of salicylate which had been colored distinctly blue. Owing to the minute quantity of coloring matter present it was impossible to identify it, but it is believed to be of artificial organic origin.—*Fourn. der Pharm. Elsass-Lothringen*, 1892, 142.

Capsicum annuum.—An elaborate investigation of this fruit with a view of closer studying the constituent principles, points out the following important results: The *alkaloidal reactions* which point to mere traces are not due to a substance pre-existing, but to some decomposition product formed either by keeping the fruit or during the chemical manipulation; the substance as isolated formed a resinous mass of conine-like odor, and was very easily decomposable by the strong alkalis. In examining the *capsaicin*, attention was also paid to its accompanying substances; ether was found to be the best solvent, as it is extracted more than any other solvent and exhausted the fruit in a short time so that the residue was void of any sharp taste; the ether extract was soluble in other solvents excepting 90 per cent. alcohol; by treating with methyl alcohol the capsaicin was removed from a considerable portion of other constit-

uents; from this solution it was attempted to isolate the capsaicin by evaporation and sublimation at 160° C., but the sublimate consisted of fatty acids carrying along mechanically a little capsaicin. It was possible to separate the fatty acids from capsaicin by precipitation with a methyl alcohol solution of lead acetate; the excess of lead acetate was removed by addition of ammonium sulphate and then by diluting with water the capsaicin and coloring matter was precipitated and then taken up in ether. Subsequent attempts to purify this product failed, the red coloring matter being intimately mixed or combined with the capsaicin (which appears to be an amorphous acid from its behavior towards alkalis, alkaline earths and metallic salts). The accompanying substances were identified as uncombined oleic, palmitic and stearic acids, also a red coloring matter which is not positively identical with carotin, but by saponification was proven to be a cholesterinester of the fatty acids.—H. Pabst; *Archiv der Pharm.*, 1892, 108–134.

Black Phosphorus, obtainable by the prolonged action of ammonia and heat upon ordinary powdered phosphorus, until the powder remaining becomes permanent in air and ceases to smell of hydrogen phosphide, has been proven to be *arsenic*; the ammoniacal solution contains the salts of the lower acids of phosphorus, but is free from phosphates and arsenic salts. The presence of the arsenic in the commercial phosphorus is traceable to the sulphuric acid used in its preparation; the phosphorus is considered to hold the arsenic dissolved, and when acted upon by ammonia may give rise to a red or brown colored powder which, however, disappears after some time, leaving a black, lustreless powder composed of metallic arsenic.—F. A. Flückiger, *Archiv der Pharm.*, 1892, 159.

A Substitute for Goulard's extract.—The action of magnesium acetate solution upon magnesium oxide in hydrating the latter and causing a considerable portion to dissolve, has been made use of in the manufacture of "*sinodor*" preparations as deodorizing agents. Magnesium acetate solutions also have the power of dissolving lead oxide, and this is the basis of a patent for the manufacture of "white lead." A solution containing 4 per cent. lead oxide is also offered as a therapeutic agent in which the action of lead oxide is especially desired. It is made as follows: 187 gm. dilute acetic acid are diluted with water and saturated with magnesium carbonate free from chloride, and water added to make one kilo. After filtering

this, the specific gravity should be about 1.0377, the solution containing 10 per cent. magnesium acetate; it is then heated in a water-bath for one hour with 7 per cent. lead oxide, and by the addition of water the original weight (one kilo) restored; after standing 24 hours the specific gravity is again determined, a difference of 0.001 indicating 1 per cent. lead oxide; if the difference is greater than 0.004 the solution must be correspondingly diluted. From the finished preparation an efficient *lead water* can be made by the addition of 4 parts to 96 parts water.—Dr. Kubel, *Archiv der Pharm.*, 1892, 173.

Anemonin.—In taking up the chemical examination of this substance, preliminary trials were made with a number of plants to ascertain its most productive source. The herbs of *Anemone nemorosa* L., *A. pulsatilla* L., and *A. pratensis* L., *Ranunculus reptans* L., *R. acer* L. (45 pounds yielded 11.5 gr.) and *R. secleratus* L., and the leaves of *Clematis angustifolia* and *C. integrifolia* all contain the principle; the leaves and tubers of *Aconitum napellus* L., probably, although not certainly, also contain it. Of these several herbs, those containing it in largest amount, *A. pulsatilla*, *A. pratensis* and *ranunculus acer*, were used in the fresh state, cut up and distilled in a current of steam; the first distillates, strongly pungent, were collected separately; the later, weaker distillates were used in macerating fresh portions of the herbs. From these aqueous distillates chloroform extracted the pungent principle; by distillation most of the solvent was recovered, and the concentrated solution then set aside to crystallize. *Anemonin* crystallizes first, and after washing with chloroform (in which it is not very soluble) forms odorless crystals, melting at 150–152° C. The mother-liquor from the anemonin crystallization solidified to a mass of hard, lustrous, rhombic prisms, which are called *Anemon-camphor*; this at 150° C., losing water, sinters together; at higher temperature it evolves pungent vapors and carbonizes at 300° C; it possesses a very sharp, irritating odor, acting especially upon the eyes and mucous membranes of the nose and respiratory organs; placed upon the skin, it first causes reddening, and later produces painful blisters; the chloroform solution is neutral, but decomposes (as does also the aqueous solution), and then has an acid reaction, due to the formation of *anemonin* and amorphous *isoanemonic acid*; if this change is due to oxidation or to the

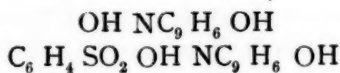
splitting off of water has not been ascertained. It is due to this decomposition that these several drugs lose their pungency upon drying; it made considerable difference in the yield of the camphor if the herbs were distilled as soon as gathered, or if six or eight days elapsed before doing so. *Anemonin* is colorless, inodorous, tasteless, of neutral reaction, and melts at 152° C.; in the melted state it has a burning taste and produces numbness of the tongue; it is slightly soluble in cold water and alcohol, easier if these solvents are hot—also in chloroform and fixed oils, but not in ether; it is soluble, with yellow color, in aqueous alkalies neutralizing them; it is volatile when boiled with water, the vapors being quite irritating; it readily reduces the salts of the noble metals, also Fehling's solution. It has the formula $C_{10}H_8O_4$, and is the anhydride of a dibasic acid containing an additional aldehyde or ketone group; it is unsaturated, uniting with four atoms of bromine; heating with acetic anhydride produces an isomer, *isoanemonin*. Besides the constituents mentioned, there were found two acids in these herbs: *Anemonic acid*, $C_{10}H_{10}O_5$, a dibasic acid with an aldehyde or ketone-group, can be made by boiling an aqueous solution of anemonin with lead oxide; it forms hard, white needles, melting at 210° C. *Anemoninic acid*, $C_{10}H_{12}O_6$, is also dibasic, and results by warming anemonin with dilute acids, HCl or H_2SO_4 , also with bases like potassa and baryta; it forms a pale, brown powder, melting at $116-117^{\circ}$ C.—H. Beckurts, *Archiv der Pharm.*, 1892, 182-206.

Scopolamine.—The alkaloid *hyoscine* which has heretofore been considered isomeric with atropine and hyoscyamine, $C_{17}H_{23}NO_3$, really has the formula $C_{17}H_{21}NO_4$, and is identical with a base called *scopolamine* by Prof. E. Schmidt, from the fact that it was first isolated from the root of *scopolia atropoides*; this is not the only source of the alkaloid, since it occurs in considerable quantity in *hyoscyamus* seeds and in certain *duboisia*-leaves, in small quantity in *stramonium* seeds and in *belladonna* root. Commercial *hyoscine* preparations were found to consist chiefly of the salts of this base. *Scopolamine*, $C_{17}H_{21}NO_4 + H_2O$, permanent, transparent crystals, melting at 59° C. to a colorless liquid which, upon prolonged standing does not again become crystalline; the crystals kept over sulphuric acid gradually changed to an amorphous, glassy mass, which then could not be made to crystallize again. The *hydrobro-*

mate, $C_{17}H_{21}NO_4HBr + 3H_2O$; hydrochlorate, $C_{17}H_{21}NO_4HCl + 2H_2O$; hydriodate, $C_{17}H_{21}NO_4HI$; with gold chloride it forms an anhydrous double salt, $C_{17}H_{21}NO_4HCl + AnCl_3$, melting at $212-214^\circ C.$ (not corrected). Scopolamine is a tertiary base and is decomposed by baryta into scopoline ($C_8H_{13}NO_2$) and atropic acid ($C_9H_8O_2$). Scopoline distils at $241-243^\circ C.$ without decomposition and solidifies to a crystalline mass which, recrystallized from ligroin, forms colorless needles melting at $110^\circ C.$ —*Archiv der Pharm.*, 1892, 206-232.

Examination of oleic acid.—The purity of the commercial acid is ascertained by Dr. Hager by (1) the specific gravity 0.895-0.915; (2) solubility in 80 per cent. alcohol and (3) perfect solubility in benzin (presence of water and alcohol causing a turbidity). The second test is for the detection of hydrocarbons. Th. Salzer states in this test while the hydrocarbons themselves are not soluble in 85 per cent. alcohol considerable quantities will dissolve in the presence of oleic acid; he has found an addition of 25 per cent. rosin oil to oleic acid to answer the above requirements and therefore advises the use of a more dilute alcohol sp. gr. 0.860. In adding to 5 cc. alcohol of this specific gravity, there is produced a permanent turbidity on addition of 6 cc. pure olein, 5 cc. olein containing 5 per cent. rosin, 4 cc. olein with 10 per cent., 3 cc. olein with 20 per cent. rosin oil. There is produced a turbidity on adding a small quantity of these adulterated oleins to 5 cc. of the alcohol, but this disappears upon adding more.—*Pharm. Centralhalle*, 1892, 290.

Oxychinaseptol or *diaphtherin*, a new antiseptic in which combination is effected between one molecule ortho-phenol-sulphonic acid (sulpho-carbolic acid, aseptol) and two molecules oxychinoline. It is stated to have the formula:



and forms a yellow powder, easily soluble in water; dilute alkalis and blood cause a separation oxychinoline to which is due its antiseptic value. It is used in one per cent. solution; and is admitted to have one disadvantage, namely, causing a dark precipitate (resembling tannate of iron) when brought in contact with iron instruments which are not evenly nickel-plated, some other metals react in the same way; these colorations are objectionable if any stitching has

to be done since the black spots may not disappear again—Prof. Emmerich, *Pharm. Ztg.*, 1892, 317.

Gravimetric standardization of normal acids.—This depends upon adding to a definite volume of the acid an excess of ammonia water and evaporating to dryness; in determining hydrochloric acid the residue, NH_4Cl , is dried at 100°C . to constant weight; multiply by 0.68224 for weight of HCl ; with sulphuric acid the dry residue $(\text{NH}_4)_2\text{SO}_4$ is finally heated for one-half hour to 120°C .; multiply by 0.742 for weight H_2SO_4 ; with oxalic acid the residue, $(\text{NH}_4)_2\text{C}_2\text{O}_4$, is dried at $100\text{--}105^\circ \text{C}$.; multiply by 1.016 for weight of oxalic acid. This method gives perfectly accurate results if a pure ammonia, which should leave no residue upon evaporation is used.—Dr. H. Eckenroth, *Pharm. Ztg.*, 1892, 317.

Test for veratrine.—Instead of sugar, as used by Weppen in his color test for veratrine, E. Laves uses furfural, the colors obtained being much purer. In a test tube 3–4 drops of a 1 per cent. aqueous furfural solution is mixed with 1 cc. pure sulphuric acid. Of this solution 3–5 drops are placed in a capsule and the substance to be tested applied to the edge of the liquid; a dark blue streak which changes to a green as it traverses across the acid; upon mixing the liquid a uniform dark green color results, which, only after some time changes to a blue or violet.—*Pharm. Ztg.*, 1892, 338.

RAPID METHOD OF SOLUTION IN THE COLD.¹

By J. B. COLEMAN.

The author found that by simply passing a current of air through the coarsely powdered solid suspended in water complete solution is obtained, in some cases in the space of 15 minutes, and in most cases before the expiration of an hour. The solid is put into a glass cylinder half filled with distilled water. The mouth of the jar is tightly stoppered with an india-rubber cork through which pass two glass tubes. One tube has inserted in the upper end a plug of cotton wool to keep out dust, whilst the lower end is drawn out and bent, and passes to the bottom of the cylinder; the other tube just passes through the cork. Before use, the cylinder is surrounded by a vessel containing water of the temperature at which the solubility

¹ *J. Soc. Chem. Ind.*, 10, 231–233; *Jour. Chem. Soc.*, 1892, 397.

is to be taken; the short tube is then connected with a water aspirator. The advantages of this process consist in the comparatively short time required for solution, and in the circumstance that no expensive apparatus, such as water motors and revolving agitators, are required. In places where high-pressure water is not available, steam may be substituted by attaching a flask of boiling water to the aspirator. The objections to the process are that the solution may be supersaturated by the air causing evaporation during its passage through the liquid; and, secondly, that readily oxidizable substances cannot be examined in this way. The first objection may be overcome by the use of moist air, whilst the second difficulty can usually be met by employing coal gas in place of air, care being taken that the oxygen and carbonic anhydride present in the gas are thoroughly absorbed by alkaline pyrogallol solution.

DETECTION OF ROSIN OIL IN FATTY AND MINERAL OILS.¹

BY A. GRITTNER.

The original process proposed by Storch has only a limited application, as, when sulphuric acid is added to the solution of the oil in acetic anhydride, train oil gives a red color, whilst with cholesterol, present in many fatty oils, a violet one is produced. With dark-colored mineral oils, the process fails altogether. Morawsky has modified the process by using a weaker acid of 1.53 sp. gr. Holde also made use of this acid (without the acetic), but of late, he has increased the strength to 1.624 sp. gr., as with the weaker acid the violet-red color takes a long time to develop. The author found that when mixing rape oil with 1 per cent. of rosin oil, the adulteration may be easily detected by Holde's original or modified process; but Morawsky's method was still more delicate; as it showed $\frac{1}{2}$ per cent. Black rosin oil did not give such a characteristic reaction as was observed with oils of a lighter color. Train oils, before being tested, must be shaken with alcohol, and the alcoholic solution tested for the rosin oil. The reaction is best observed by allowing sulphuric acid to run down the side of the test tube; if rosin oil be present, a red or violet ring will form at the point of contact. With

¹ *Zeit. ang. Chem.*, 1892, 265; *Jour. Chem. Soc.*, 1892, p. 548.

dark-colored oils, Holde's method is the best; but with light-colored train oils, Morawsky's process is preferable. As the reaction is also caused by colophony and shellac, the absence of these substances must be ascertained, and should they be present, it is necessary to saponify the oil and to test the unsaponifiable portion. For dark mineral oils, it is advisable to use an acid of 1.53 sp. gr., as the use of a stronger acid often causes a dark-yellow coloration, which renders the reaction less characteristic. Samples of rosin oil examined by the author gave the reaction with this acid just as plainly as with the 1.624 sp. gr. acid.

Schädler remarks that train oil mixed with syrupy phosphoric acid (5-1) gives a red color, which gradually turns very dark, and is even noticed in mixtures containing only 1 per cent. of the oil. The author never succeeded in obtaining this reaction, and only noticed a dirty brown color. The reaction depends on the nature of the rosin oil. The author occasionally succeeded in detecting an admixture of 5 per cent., but often could not find it at all. The phosphoric acid process is therefore not to be recommended.

REVISION OF CONSTANTS EMPLOYED IN THE ANALYSIS OF FATS AND OILS.¹

BY R. T. THOMSON AND H. BALLANTYNE.

In the table of "constants in oil analysis," which accompanies the original paper, will be found collected that portion of the authors' results which they regard as useful in oil analysis.

Iodine Absorption.—In a previous communication (*ibid.*, 9, 587) it was shown that the variation in iodine absorption for different olive oils was greater than usually stated. Since then, it has been found to be $\frac{1}{2}$ per cent. higher still, so that the iodine value ranges from that of Gioja (79 per cent.) to that of Mogadore olive oil (86.9 per cent.). The lowest figure for rape oil now stands at 99.1, and the highest at 105.6 per cent.

Potash Neutralizing Power.—The figures respecting olive and rape oils are in close accord with those obtained by Archbutt, and do not represent such a great variation between each individual oil as those given by other observers. The limits of five specimens of linseed oil

¹ *J. Soc. Chem. Ind.*, 10, 233-237; *Jour. Chem. Soc.*, 1892, 547.

examined by the authors vary from 19.00 to 19.28, whilst those of nine specimens tested by other observers and recorded by Allen range between 18.74 and 19.52.

Unaponifiable Matter.—Olive, refined cotton-seed, unrefined arachis, and linseed oils, contain about the same proportion of unaponifiable matter, so that the determination of that constituent in a sample, say of olive oil, would not serve to show any adulteration with either of the other three oils. But the presence of a considerable portion of rape oil would tend to reduce the percentage of unaponifiable matter. In marine oils, it is noteworthy that seal oils contain only about one-third of that contained in whale, cod and menhaden oils.

Specific Temperature Reaction.—This is merely a modification in recording the results of Maumene's reaction with strong sulphuric acid. It consists in mixing 50 grams of water with 10 cc. of sulphuric acid, each at 20°, and registering the highest temperature reached. The amount of water is best measured from a pipette at 15.5°, and the sulphuric acid should be run in from a pipette which will deliver the 10 cc. in one minute. During the addition, the mixture should be vigorously stirred with the thermometer, and the highest temperature reached rapidly read off, as it only remains constant for a few seconds. The oil being tested in precisely the same manner, it is only necessary to divide the rise in temperature obtained with water into that obtained by the oil under examination. The answer is the specific temperature reaction compared with water as 100. The oils must be carefully weighed, and the acid added to them exactly as with water, except that even more vigorous stirring is necessary during and after the addition of acid. In this way, the rise in temperature in all the experiments made by the authors was fairly steady up to the highest point, at which the temperature remained constant for 50 to 60 seconds. In the case of linseed, cod, seal and menhaden oils, the tests had to be made with a mixture of 20 grams of these oils and 30 grams of olive oil of known specific temperature reaction. As a rule, an oil having a high iodine absorption has also a high specific temperature reaction, but the rise is not always directly as that in the former. The reason the specific temperature reaction cannot be depended on with the same assurance as the iodine value is that it shows, in some cases, large variations for the same class of oils.

Valenta's Test.—The authors conclude from the results of their experiments that this test is surrounded with too many conditions to be of any practical value in the general analysis of oils.

Oleic Acid.—Although the percentage of free acid cannot be looked on as a constant, the authors consider that it serves a purpose in indicating to some extent the condition of the oil, and shows how little, if at all, a high free acidity affects the results of analysis.

ALKALOIDS OF BERBERIS AQUIFOLIUM AND *B. VULGARIS*.¹

BY C. RÜDEL.

The publications of Wacker, of Hesse, and of Stubbe, on the alkaloids of the roots of *Berberis vulgaris*, and those of Parsons, of Jungk, and of Stubbe on the alkaloids, of the roots of *Berberis aquifolium* show that each contains three alkaloids, and that they are in all probability the same. The chemical formula and the exact description of the salts were not, however, very perfectly defined, and the author has endeavored to complete this part of the work.

The ground up roots were in each case extracted with very dilute acetic acid, and the extract was then concentrated to a syrup. Oxyacanthine was precipitated by sodium sulphate, berberine as acetoneberberine (Gaze's method) and berbamine by the addition of sodium nitrate.

Oxyacanthine, $C_{19}H_{21}NO_3$.—The elementary analyses of the specimens of this alkaloid, as obtained from the two different sources, agreed closely with the above formula. The melting point lay between 174° and 185° ; the base appears to exist in an amorphous and in a crystalline modification. It reacts with the usual alkaloid reagents. The salts prepared were the normal *sulphate*, $(C_{19}H_{21}NO_3)_2 \cdot H_2SO_4 + 4H_2O$, white and crystalline; the *hydrochloride*, $C_{19}H_{21}NO_3 \cdot HCl + 2H_2O$, prepared from the *platinochloride* by precipitating the platinum with hydrogen sulphide, white and crystalline; the *platinochloride*, $(C_{19}H_{21}NO_3)_2 \cdot H_2PtCl_6 + 5H_2O$, a yellow, amorphous salt which could not be obtained crystalline; and the *aurochloride*, $C_{19}H_{21}NO_3 \cdot HAuCl_4 + 4H_2O$, a golden-yellow, amorphous substance, which likewise could not be obtained crystalline.

¹ *Arch. Pharm.*, 229, 631-666; *Jour. Chem. Soc.*, 1892, 641.

These salts of oxyacanthine from different sources were alike in all respects.

Berbamine, $C_{18}H_{19}NO_3$, separated from the solution of the alkaloids by the addition of sodium nitrate, was purified by precipitating the solution of the sulphate with ammonia and recrystallizing from anhydrous ether. Thus obtained, it forms a fine, white, crystalline mass. The specimens from both sources proved to be identical. The following salts were prepared: the normal sulphate, $(C_{18}H_{19}NO_3)_2 \cdot H_2SO_4 + 4H_2O$, crystalline; the platinochloride, $(C_{18}H_{19}NO_3)_2 \cdot H_2PtCl_6 + 5H_2O$, a light-yellow, amorphous powder; and the aurochloride, $C_{18}H_{19}NO_3 \cdot HAuCl_4 + 5H_2O$, a golden-yellow, amorphous powder.

Berberine, $C_{20}H_{17}NO_4$, was most readily separated by Gâze's acetone method. Acetoneberberine, $C_{20}H_{17}NO_4 \cdot C_3H_6O$, was obtained as a lemon-yellow, crystalline powder; acid berberine sulphate, $C_{20}H_{17}NO_4 \cdot H_2SO_4$, prepared by treating acetoneberberine with dilute sulphuric acid, is a pale-yellow, crystalline salt; the nitrate, $C_{20}H_{17}NO_4 \cdot HNO_3$, prepared by treating the acetone compound with the exact quantity of nitric acid, is a crystalline, yellowish-red salt; the platinochloride, $(C_{20}H_{17}NO_4)_2 \cdot H_2PtCl_6 + H_2O$, prepared by precipitating the hot solution of the hydrochloride with platinum chloride, is obtained as a yellow, crystalline precipitate; the hydrochloride, $C_{20}H_{17}NO_4 \cdot HCl + 4H_2O$, obtained by decomposing the acetone compound with hydrochloric acid, is a light orange-yellow-colored salt.

Since Gâze found a "methylberberine" accompanying the berberine which he obtained from *hydrastis berberine*, the author converted a considerable quantity of his berberine specimen into hydroberberine, by reduction with zinc and sulphuric acid, and searched very carefully among the crystals of hydroberberine which were obtained for any second substance. No such other alkaloid could, however, be found.

ALLIACEOUS PLANTS AND THEIR PRODUCTS.

BY P. L. SIMMONDS, F.L.S.

[Concluded from p. 329.]

Passing now to the products of the *Ferulas*, the best asafoetida is called *Hing*, which literally means the pure or superior drug. The term *hira-hing* is applied to a treacly liquid found in the centre of the goat skin bales from Kandahar. This form of the drug has from the remotest times been held in great esteem by Eastern doctors, and was once regarded as worth its

weight in silver. It is used by wealthy people in Central India, and has an odor like a mixture of garlic and oil of caraway.

There are two species of asafœtida known in India, namely, *Hing* and *Hingra*. *F. alliacea*, Boiss., produces the first kind, that preferred as a condiment.

F. fetida, Regel, produces *Hingra*, the thick, opaque gum obtained from the root, which is the asafœtida of European commerce. But with certain species of *Ferula* different systems of extraction and manipulation, or diversified conditions of climate and soil, may produce both *Hing* and *Hingra*. According to Dr. G. Watt (*Economic Products of India*), it may, however, be safe to affirm that the bulk of the Persian drug imported into India is the *Hing* derived from *F. alliacea*, but that a considerable proportion of the *Hingra* comes also from Persia and Turkestan. The whole of the asafœtida that enters India by the frontier land routes from Afghanistan, is now satisfactorily proved to be derived from *F. fetida*. India is the largest asafœtida consuming country in the world. The imports in 1888-89 were 10,500 cwt., and about two-thirds of these imports remain in India. The shipments go entirely to the United States, Australia and Mauritius. *Hing* of good quality is worth about £8 the cwt. in Bombay.

Asafœtida is commonly used by the natives of all parts of India as a condiment or flavoring, and is especially prized by the vegetarian Hindu classes in several of their dishes in curries and as sauce for pillaus and especially mixed with their rice, dal or pulse, etc., and is even chewed as a luxury. It is not an article of general consumption in Afghanistan itself. The fresh leaves of the plant, which have the same peculiar odor as its secretion, when cooked, are commonly used as a diet by those near whose abode the plant grows. And the white inner part of the stem of the full-grown plant is considered a delicacy, when roasted and flavored with salt and butter. Although the odors of oil of garlic, oil of onions and asafœtida are similar, the latter contains no trace of allyl.

The imports of asafœtida into the United States were, in 1888, 71,966 lbs.; in 1889, 102,379 lbs., and in 1890, 79,689 lbs. The medicinal uses of asafœtida in Persia are very numerous. There are people in that country who are so accustomed to its use for nervous complaints, that it is like opium to the opium eaters—one of the necessities of life. Its excellent antispasmodic qualities are too little known and appreciated in Europe. It is a moderate nervine stimulant, an efficient expectorant and feeble laxative, useful in hysterical and spasmodic affections, such as asthma, whooping-cough, angina pectoris, flatulent colic, etc. If taken daily, it is said to prevent the attacks of malarious fever. In ringworm it is applied as a paste.

In 1888, 452 packages of asafœtida came to London, and in 1890, 931 packages.

An essential oil, obtained from the medicinal drug, is dark brown in color, of a strong garlic odor. Sp. gr. 0.984.

Various species of *Ferula* are stated to yield the galbanum gum resin, but it is chiefly referred to *F. galbaniflua*, Boissier. Galbanum occurs in commerce in two forms—in tears and in mass. Very little reaches London, 20 or 30 cases at most yearly. As an antispasmodic, galbanum is far less powerful than asafœtida, but in its stimulating expectorant properties, it is allied to

ammoniacum. Liquid Persian galbanum is derived from an undescribed species of *Ferula*.

The ordinary galbanum of European commerce is the Levant resin. Oil, distilled from the gum, is an excellent substitute for copaiba.

F. rubicaulis, Boiss., does not yield galbanum, but a gum resin of alliaceous odor.

F. communis, Lin., plentiful in Algeria, near the Morocco frontier, yields voluminous tears of a gum resin much resembling ammoniacum.

F. Persica and *F. Szowitziana*, DeC., are said to yield the medicinal gum resinous exudation known as Sagapenum. It is called "Sagbineosch" in Persian, from which the common name is derived. It is met with in the form of yellow, brown or reddish, agglutinated grains, of garlic odor intermediate between asafetida and galbanum, and of acrid, bitter taste, softening with the warmth of the hand. When heated it evolves a peculiar smell, partaking of garlic and juniper, which is neither so powerful nor so disagreeable as that of the fetid gum.

The root of the horseradish, *Cochlearia Armoracia*, Lin., *s. Armoracia rusticana*, Fl. Wett., *s. A. sativa*, Bernh., has a pungent taste and smell, and contains a volatile oil allied to mustard. Although principally used as a condiment with meat, it is included in the British Pharmacopœia, and considered highly stimulant and diuretic, exciting the stomach and promoting the secretions, and is also antiscorbutic. A volatile oil, known as *scurvy grass oil*, is obtained by distillation from various species of *Cochlearia*, as *C. officinalis*, *C. danica* and *C. anglica*. Density, 0.942.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

The Alabama Pharmaceutical Association convened at Mobile, May 10, in eleventh annual meeting. Besides the usual routine business, a discussion was had on perfecting the pharmacy law, and several papers were read on "Preliminary Education," "the National Formulary," and "the Metric System." The next annual meeting will be called at Blount Springs at a date to be announced hereafter, the intention being to adjourn with the view of continuing the meeting in the Alabama building on the Fair grounds in Chicago. The officers for the present year are: Mosely F. Tucker, Mobile, president; P. C. Candidus, secretary, and E. P. Galt, Selma, treasurer.

The Delaware Pharmaceutical Association met at Wilmington, May 5, and transacted chiefly routine business. A paper on *Yucca angustifolia* was read by E. Bostick. N. B. Danforth was elected president; J. J. Gallagher, treasurer; J. M. Harvey, recording secretary, and T. C. Taylor, local secretary for the meeting to be held next year at Wilmington, May 4.

The Florida State Pharmaceutical Association held its sixth annual meeting at the Alcazar Hotel, in St. Augustine, April 12, President Phillips in the chair. The most important business transacted was the discussion on certain defects in the pharmacy law, which resulted in the adoption of several amendments, these being referred to the legislative committee. H. C. Cushman read a paper upon Florida phosphates, and Dr. Phillips one entitled "The thread-

bare subject." The officers for the present year are : N. Woolridge, Jacksonville, president ; W. H. Lightstone, Jacksonville, secretary, and E. Delouest, Ocala, treasurer ; the former secretary, S. P. Watson, declined a re-election, owing to his contemplated removal to Atlanta, Ga. The next annual meeting will be held at Pensacola on the second Wednesday in May, 1893, with Henry C. Cushman as the local secretary.

The Georgia Pharmaceutical Association opened its seventeenth annual meeting May 3, at Columbus, President Slack in the chair. Routine business and legislative affairs received the attention of the association. Besides several papers on general subjects, the following were read : Wine of beef and iron, tincture of chloride of iron, fluid extract of cascara sagrada and medicated waters. E. M. Wheat, Columbus, was elected president ; M. H. Taylor, Macon, treasurer, and H. H. Arrington, Summerville, secretary. Next year the association will meet at Rome, at the call of the president, it being the intention to continue the meeting in Chicago.

The Indiana Pharmaceutical Association, on the occasion of its 11th annual meeting, was called to order by President Buntin, at Indianapolis, May 12. The president's address, the reports of officers and committees, and discussions on legislation, trade interests and on the Paddock pure food and drug bill occupied most of the time at disposal. The officers for the current year are : Frank H. Carter, Indianapolis, president ; F. W. Meissner, Jr., La Porte, secretary, and G. G. Allen, Indianapolis, treasurer. The time and place of the next meeting will be announced by the executive committee.

The Kansas Pharmaceutical Association assembled in the thirteenth annual meeting at Chelsea Park, May 17, president Baker in the chair. The president read his annual address, the other officers and committees made reports, a number of papers were presented on work done by students at the School of Pharmacy connected with the University of Kansas, and several addresses were delivered by professors of the University. M. Noll, Atchison, was elected president ; Mrs. M. A. Miner, Hiawatha, secretary, H. W. Spangler, Perry, treasurer. The next meeting is to take place at Wichita, May 23, 1893 ; local secretary, H. H. Hettinger.

The Kentucky Pharmaceutical Association had selected Carrollton for holding its fifteenth annual meeting, May 18. Routine business, reports of officers and committees and discussion of legislative measures were the prominent features of the meeting, which closed with an excursion on the Kentucky River and with a banquet. The officers for the current year are : O. W. Grier, Carrollton, president ; J. W. Gayle, Frankfort, permanent secretary ; Howard Jett, Cynthiana, treasurer, and the local secretary, C. P. Frick, of Louisville, where the next meeting will be held in May, 1893.

The Louisiana State Pharmaceutical Association met at its tenth annual meeting in New Orleans, April 13. The sessions were devoted chiefly to the consideration of the various official reports and of the contemplated amendments to the pharmacy law. The officers for the present year are : L. F. Chalin, president ; Mrs. E. Rudolph, secretary, and E. Lalmont, treasurer. The next meeting will again convene in New Orleans, May 9, 1893.

The Maine Pharmaceutical Association held its third annual meeting, since the reorganization, at Harpswell, June 15, President Partridge in the chair, whose address was of a very comprehensive character. The business transacted consisted in the consideration of the various reports, and of proposed legislative measures. The newly elected officers are: Asa Warren, Bangor, president; H. E. Bowditch, Augusta, secretary; H. B. Pennell, Portland, treasurer, and J. Williamson, Portland, corresponding secretary.

The Mississippi Pharmaceutical Association effected a reorganization at Jackson, May 10, when H. F. West, Natchez, was elected president, D. E. Holt, Terry, secretary, and O. Lillybeck, Meridian, treasurer. The association will again meet at Jackson, May 9, 1893.

The Nebraska State Pharmaceutical Association met in its eleventh annual meeting, June 7, at Grand Island, officially welcomed by its fellow-member, H. D. Boyden, mayor of the city. The annual address by President Evans, the reports of officers and committees, and a discussion on the Paddock pure food and drug bill occupied the attention of those present. Several papers were read, mostly relating to ethical subjects. A paper by C. Dummer, on the *coating of pills with keratin*, described the process followed, using an ammoniacal solution of commercial keratin. No water is to be used in making the pills, and they may be coated thinly with cacao butter to protect the ingredients against the influence of the ammonia; they are fixed upon the points of needles, dipped and rotated in a manner similar to that practised in gelatin coating. The solution is made of keratin 7 p., ammonia water 50 p. and alcohol 50 p. Several coatings are to be applied, the preceding one being previously dried. The executive officers for the ensuing year are: D. J. Koenigstein, Norfolk, president; Julia M. Crissey, Omaha, secretary; and C. R. Sherman, Omaha, treasurer. The next meeting will be held at Nebraska City the local secretary to be appointed later.

The New Jersey Pharmaceutical Association held its twenty-second annual meeting at Plainfield, May 25, listened to the various reports and to several essays, and finally adjourned to meet next year at Atlantic City, May 24. The officers for the year are: R. J. Shaw, Plainfield, president; W. C. Alpers, Bayonne, secretary, and W. M. Townley, Newark, treasurer.

The Ohio State Pharmaceutical Association assembled in Canton, June 14, for holding its fourteenth annual meeting, when 53 new members were elected, and Prof. F. A. Flückiger was chosen an honorary member. A visit to the Deuber watch works and an excursion to Myer's Lake were made on the second day of the meeting. C. N. Nye, Canton, was elected president for the ensuing year; L. C. Hopp, Cleveland, secretary; J. H. Von Stein, Upper Sandusky, treasurer, and John C. Firnin, Findlay, local secretary for the meeting to convene at Findlay, May 9, 1893.

Pennsylvania Pharmaceutical Association.—In the angle formed by the confluence of the North Branch with the Susquehanna River is located the town of Northumberland. Directly opposite, from the right bank of the river, arises a rocky prominence, almost perpendicularly, to the height of 500 feet. From this point, located in the southeastern corner of Union County, a magnificent view is had over the fertile rolling country of Northumberland.

County, the view being closed in the distance by various chains of the Appalachian Mountains, those to the southeast skirting one of the principal anthracite basins of Pennsylvania, and those towards the northwest being well supplied with iron ore. The steep cliff is now known as Susquehanna Heights, and upon its summit a hotel has been recently erected named Hotel Shikellimy. It was here that the Pennsylvania Pharmaceutical Association held its fifteenth annual meeting, June 14 to 16.

President J. Patton occupied the chair. Five sessions were held, the first and second sessions being occupied chiefly by the reading of the addresses and reports by the officers and committees, and discussions thereon.

The various reports were ordered for publication, and resolutions were passed favoring the regulation of the practice of medicine by legislation similar to that which had been proposed at the last session of the Pennsylvania legislature; and also declaring in favor of strictly upholding article vii of the code of ethics of the Pennsylvania Pharmaceutical Association, which is in opposition to the giving of medical advice by the pharmacist.

On the afternoon of June 15 the association held no session, with the view of affording the members and their ladies an opportunity of visiting the old home of Dr. Joseph Priestley, the discoverer of oxygen. The party crossed the Susquehanna in one of the little steamers plying between Sunbury and Northumberland, and on landing at the latter town proceeded to the mansion of the Priestley family, where they were kindly received by the ladies of the family and shown a number of relics relating to the philosopher of the past century, and had also an opportunity of looking through the album, commemorating the centenary celebration of chemistry by American chemists in the borough of Northumberland, August 1, 1874. Most of the apparatus constructed by Priestley have been donated by the family to the National Museum in Washington, where they are now preserved. Next a visit was made to the old mansion built by Priestley near the North Branch of the Susquehanna, and to the laboratory, Priestley's workshop, adjoining the dwelling, but now doing duty as a woodshed. The contemplated visit to Priestley's grave had to be omitted, owing to the distance of the cemetery and to the warm weather, it having been found impossible to procure a sufficient number of vehicles for the company.

A number of papers were read on Thursday, and many specimens were shown in illustration of the subjects discussed. Four of these papers are reproduced in the present number of the Journal, treating of Infusion of Digitalis, by J. W. England; Compressed Tablets and Triturates, by J. H. Hahn; Spices, by Chas. A. Heinitch, and Examinations of Pharmacy Boards, by Prof. Remington.

The percentage of alcohol-soluble matter in asafetida was discussed by G. W. Kennedy. Ten samples were examined, about four ounces of each being exposed to cold, and then reduced to coarse powder; 200 grains of this powder was then completely exhausted with alcohol and the undissolved portion dried at a slow heat and weighed, the loss in weight indicating the alcohol-soluble matter, which in this case includes also the moisture present in each sample. The percentages of soluble matter were 29.25, 33.60, 41.20, 48.20, 48.40, 50.00, 56.80, 57.50, 58.80 and 68.80, the latter having been labelled "purified German,"

and the two preceding ones "dry tears" and "soft tears," respectively. The undissolved portions proved to be gum and various kinds of earthy matters.

Saccharum lactis.—The paper on milk sugar, by A. J. Tafel, states that this sugar was first recommended as a remedy by Prof. Ludovico Testi, of Reggio, in 1698. The process for preparing it in Switzerland from the whey of cow's milk by evaporation and recrystallization with the addition of a little alum and removing the scum during the boiling, has recently been improved upon by running the whey through animal charcoal, and concentrating the filtrate by means of a vacuum pan; thus prepared milk sugar contains traces of albuminoids and a larger proportion of salts than is found after recrystallization. If the free acid contained in whey be neutralized with prepared chalk, the yield of milk sugar is stated to be increased from about 3 to 4 per cent. An admixture of cane sugar may be detected by Lacrin's process, by heating it, mixed with an equal weight of oxalic acid, by means of a water-bath, when the mixture melts and becomes but slightly darker on continuing the heat; in the presence of one per cent. or more of cane sugar the mass becomes rapidly darker, greenish brown, or even black. About thirty years ago from 40 to 50 tons of milk sugar were annually consumed in the United States; but at present four or five times that quantity are used. Many thousands of gallons of whey are still annually running to waste in this country at the numerous cheese factories; were these utilized, it is believed that milk sugar might, in time, become an article of export, instead of being in great part imported as at present.

Polygala alba.—Specimens of the plant, with root, were shown by Prof. Maisch, the root varying in thickness from almost filiform to $\frac{3}{8}$ inch in thickness near the crown. The party sending it from northern Kansas wrote that the plant abounds in large quantities, and the people would be glad to supply the root.

Aden Senna was also exhibited by Professor Maisch, who had received it from Mr. H. G. Greenish. It consists of the leaflets and some pods of *Cassia holosericea*, which plant is perhaps better known as *C. pubescens* and *C. Schimperi*; it grows in Abyssinia, and though considered inferior to *C. acutifolia*, has appeared in European commerce, owing to the scarcity of Alexandria senna; the leaflets appear to be present in some lots of what is now sold as Alexandria senna in the United States.

The preparation of fruit juices by pharmacists for their own use was recommended in a paper by L. Emanuel as being quite profitable. These juices may be preserved by adding 120 grains of boric acid dissolved in one fluid ounce of boiling water to each quart of the juice. However, the author prefers to convert the fresh juice into syrup.

Asepsis and antiseptis was the title of a paper by Dr. J. J. Edmundson, describing the precautions that should be adopted in preparing dressings as well as at the operating table. Formulas for the solutions used for impregnating dressings were given for *borated*, *carbulated* or *salicylated*, as follows: Acid (boric, carbolic or salicylic) 5 p., glycerin 5 p., and water enough for 100 p. *Iodoform solution*: Iodoform, 10 p.; glycerin, 10 p.; alcohol, sufficient for 100 p. *Corrosive sublimate solution*: Corrosive sublimate, 1 p.; tartaric acid, 2 p.; glycerin, 50 p.; water sufficient for 1,000 parts.

The evils of proprietary medicines were discussed in three papers, the authors of which, arguing from different premises, arrived substantially at the same conclusions, that the professional character of the pharmacist could be retained and his labors be better and more justly remunerated by adopting the course of manufacturing in his own laboratory every medicinal preparation that it is possible for him to make, and by letting the prescribing physicians and the consuming public know that goods of uniform quality and free from the claim of secrecy are made by and obtainable from him. One of the essays concluded by stating that "devotion to your chosen profession, excellence in the manufacture of your own preparations, care, knowledge, hard work, honesty and integrity—and you will succeed in driving from the market the many pharmaceutical nostrums with which it is flooded, and supplanting them with legitimate preparations."

The remaining papers dealt with the sale of drugs and medicines by unauthorized persons, the enforcement of the pharmacy law, and the influence of original papers upon pharmaceutical associations.

Adopting a suggestion made in President Patton's address, the Association voted to hold the next annual meeting in the western part of the State, and after considering various propositions the Committee's report was adopted by selecting Eureka Springs near Sægertown, in Crawford County, as the place, and the second Tuesday of June, 1893, as the time for holding the next meeting. Wm. H. McGarrah, Scranton, was elected president; Wm. McIntyre, Philadelphia, and W. H. Reed, Norristown, vice-presidents; and secretary J. A. Miller, Harrisburg, and treasurer Jos. L. Lemberger, Lebanon, were re-elected to these offices. The appointment of a local secretary was referred to the executive committee and officers of the Association.

The Tennessee State Druggists' Association convened at Tullahoma, May 25, was welcomed by Mayor Marshall, listened to the reports of officers and to the reading of several papers, discussed pharmacy legislation and trade interests, and finally adjourned to meet next year in Nashville. The officers elected are: J. O. Burge, Nashville, president; W. Vickers, Murfreesboro, secretary, and J. F. Voight, Chattanooga, treasurer.

The Texas Pharmaceutical Association had its thirteenth annual meeting in Waco, May 10, President G. H. Kalteyer in the chair. The president's address, the officers' reports and several papers read, furnished material for discussions. It was announced that efforts are being made for the establishment of a chair of pharmacy in the medical department of the Galveston University. Oak Cliff, a suburb of Dallas, was selected for holding the next meeting May 9, 1893. J. Burgheim, Houston, was elected president; G. W. Heyer, Houston, secretary, and F. W. Shook, Dallas, treasurer.

The Utah Pharmaceutical Association was organized at Salt Lake City, April 6 last, by the adoption of a constitution and by-laws, and the election of J. B. Farlow, Salt Lake City, president; C. H. McCoy, Salt Lake City, secretary, and S. P. Ash, Ogden, treasurer. In the evening a banquet was tendered to the young association by the local druggists at the Knutsford Hotel, at which Governor Thomas was present.

The Washington Pharmaceutical Association met at Seattle, May 3, and

elected A. B. Stewart, Seattle, president; W. B. Shaw, secretary, and Jas. Lee, treasurer. The fourth annual meeting will take place at Spokane, May 1, 1893.

The Pharmaceutical Examining Board of Pennsylvania held an examination in Harrisburg, April 25, when out of 151 applicants for registered pharmacist certificates, seventy, and of 61 candidates for qualified assistants certificates, twenty-nine received the certificates.

The Cincinnati College of Pharmacy had its twentieth annual commencement April 21, at Sinton Hall, on which occasion addresses were made by Dr. Louis Schwab, one of the earliest graduates of the school, by Prof. Fennel and by President Klayer, who conferred the degree of Graduate in Pharmacy upon 29 candidates. After the distribution of various prizes and the close of these exercises, the class was entertained with a supper, participated in by members of the college and alumni.

The School of Pharmacy of the Kansas State University held its commencement June 6.

The Massachusetts College of Pharmacy, at its commencement, held May 25, conferred the degree of Graduate in Pharmacy, through its president, S. A. D. Sheppard, upon 26 candidates. Addresses were made by Professors Patch and Greenleaf, and by Chas. W. Perkins and G. E. Thomas.

The National College of Pharmacy held its twentieth annual commencement at the National Theatre, Washington, D. C., on the evening of June 18, when diplomas were conferred upon twelve graduates.

REVIEWS.

Jahrbuch der Chemie. Bericht über die wichtigsten Fortschritte der reinen u. angewandten Chemie, unter Mitwirkung von Beckurts (Braunschweig), Benedikt (Wien), Bischoff (Riga), Dürre (Aachen), Eder (Wien), Häussermann (Stuttgart), Krüss (München), Märcker (Halle), Nernst (Göttingen), Röhmann (Breslau), herausgegeben von Richard Meyer (Braunschweig). Frankfurt am Main: H. Bechhold. 1892.. 8vo. Pp. 544. Price, cloth, 12 marks.

Year-book of Chemistry. Report on the most important advances in pure and applied chemistry.

We have before us the first volume of a new annual intended for the publication of classified reports on the more important researches in the different branches of chemical science, and in this manner to give an intelligent survey of the work done and the progress made in each branch, without going into minute details which can be ascertained by consulting the journals devoted to the various branches of science. This "year-book" is, therefore, not intended as a mere compilation of papers published with a more or less full presentation of the details of the investigations made; but rather as a well digested report on such researches and their results determined during the preceding year. To illustrate the manner in which this is done we translate a short paragraph from the section on Pharmaceutical Chemistry, as follows:

"The so-called *synthetic carbolic acid*, which, on its commercial introduction a few years ago, attracted much attention, has now almost completely lost its importance, since it became known that it is likewise subject to the unpleasant

reddening. The cause of this coloration of carbolic acid has recently been investigated by Fabini (Phar. Post, 1891, xxiv, 185); for the production of this effect he found the presence of ammonia, hydrogen binoxide and traces of metal necessary. A carbolic acid, containing ammonia and a metal, rapidly turns red in the presence of hydrogen binoxide on warming; but a carbolic acid, free from metal, is never reddened on the addition of ammonia and hydrogen binoxide. The coloring matter named *phenerythene*, $C_{30}H_{30}NO_4$, is stated by Fabini to be a derivative of quinonimide, the sulphate of which is indigo blue."

To expedite the publication of the year-book the labor has been divided, each reporter presenting that class of investigations in which he is specially interested; thus the "Year-book" is naturally divided into a number of chapters or sections, as follows: Chemical physics, inorganic chemistry, organic chemistry, physiological chemistry, pharmaceutical chemistry, chemistry of articles of food, agricultural chemistry, metallurgy, inorganic industrial chemistry, explosives, technology of the carbohydrates and of fermentation, technology of the fats, chemistry of tar and coloring matters, photography.

The division of the labor thus carried out, insures on the one hand comprehensiveness of each report, and on the other hand the early publication of the work after the close of each year, considerations which are of weighty importance to those who desire to consult such reports. That each of these is as complete as it can possibly be made in the sense indicated above, may be expected from the collaborators, and the usefulness of the book is thus readily seen. The external appearance of the work is in keeping with its internal value and usefulness.

Reagents and Volumetric Solutions proposed for the U. S. Pharmacopœia, together with some specimens of the text proposed. St. Louis. 1892. 8vo. Pp. 40.

This pamphlet has been published for the use of the members of the committee of revision, and the friends who have volunteered their assistance. It is also designed to elicit expressions of opinion relating to both matter and form of the subjects connected with the pharmacopœia.

Manual of the Phanerogams and Pteridophytes of Western Texas. By John M. Coulter. Published by authority of the Secretary of Agriculture, Washington, 1892. 8vo. Pp. 153 to 345.

We have noticed the first part of this Flora on page 421 of our last volume, and now record with pleasure the publication of the second part, embracing the gamopetalæ of the district named in the title.

Manual of Pharmacy and Pharmaceutical Chemistry; designed especially for the use of the pharmaceutical student and for pharmacists in general. By Chas. F. Heebner, Ph.G., Professor of Pharmacy and director of the pharmacal laboratory at the Ontario College of Pharmacy. Third edition. New York: J. H. Vail & Co. 1892. 12mo. Pp. 252.

On the appearance of the first edition in 1888 we have commented somewhat in detail on the scope and character of the work. The present edition is in the main identical with the first; but some of the vague statements contained in the latter have been corrected or modified in the present edition, and a fourth part on urinalysis has been added, covering over twenty pages, and

illustrated with figures of sediments, etc., obtained from urine, as seen under the microscope. The work is valuable as a note book to pharmaceutical students, and as a useful outline of the scope of theoretical and practical pharmacy.

Record of Experiments with Sorghum in 1891. By Harvey W. Wiley, Chemist, etc., with the collaboration of Dr. G. L. Spencer, Mr. A. A. Denton and Mr. Wibray J. Thompson. Published by authority of the Secretary of Agriculture, Washington. 1892. 8vo. Pp. 132.

Bulletin No. 34 of the U. S. Department of Agriculture, Division of Chemistry.

Coca and Cocaine; their history, medical and economic uses, and medicinal preparations. By William Martindale, F.C.S., late examiner of the Pharmaceutical Society, etc. Second edition. London: H. K. Lewis. 1892. 16mo. Pp. 76.

On the appearance of the first edition, in 1886, we noticed this little monograph in the Journal. In the edition now before us, which is printed upon white paper and in larger type than the preceding one, we find that the text has been revised, more especially in that portion devoted to the chemical constituents, the medical uses and the pharmaceutical preparations, and has thus been brought up to date.

The Transactions of the Academy of Science of St. Louis. Vol. v. Nos. 3 and 4.

The transactions extend from October, 1888, to the close of 1891; the double number before us contains various valuable papers on botanical, chemical and other interesting subjects.

Grass and Forage Experiment Station at Garden City, Kan. By Dr. J. A. Sewall.

Co-operative Branch Stations in the South. By S. M. Tracy.

The two papers cover 12 pages of a pamphlet issued by the U. S. Department of Agriculture, Division of Chemistry.

Foods and Food Adulterants.—Investigations made under the direction of H. W. Wiley, Chief Chemist. Part vi. Sugar, Molasses and Syrup, Confections, Honey and Beeswax. Washington. 1892.

This pamphlet comprises pages 633 to 874 of Bulletin 13, Division of Chemistry, U. S. Department of Agriculture.

Special Report on the Extent and Character of Food Adulterations, including state and other laws relative to foods and beverages. By Alex. J. Wedderburn, Special Agent. Washington. 1892. Pp. 174.

Bulletin 32 of the foregoing series. It is a compilation of general statements and special facts from official and other reports, and from letters received in reply to circulars sent out to various parts of the country. The collection of various laws relating to adulterations covers 85 pages of the pamphlet, and affords ample material for comparisons and study.

Fourth Annual Report of the State Pharmaceutical Examining Board of Pennsylvania for the year ending June 30, 1891. Harrisburg. Pp. 107.

It contains the lists of registered pharmacists and assistant pharmacists of Pennsylvania.

Thirty-fifth Annual Report of the Council of the Pharmaceutical Society of Australasia, with which is incorporated the Pharmaceutical Society of Victoria. Melbourne. 1892. Pp. 20.

The report gives a bird's-eye view of the prosperous condition of the Society and of the work done during the preceding year.

Proceedings of the North Dakota Pharmaceutical Association. Sixth annual meeting, held at Fargo, August 4 and 5, 1891. Pp. 75.

Six of the papers read at this meeting were presented by the late Frank Frisby. The next meeting will be held at Fargo, August 2, 1892. L. Christianson, Fargo, is the secretary.

Proceedings of the Ohio State Pharmaceutical Association, at its 13th annual meeting, held in Dayton, June 9-11, 1891, etc. Cleveland. 8vo. Pp. 162.

A brief report of the transactions will be found in our last volume, p. 371. This issue is embellished with the portrait of the late A. Mayell, of Cleveland.

Catalogue of the Hanbury Herbarium, in the Museum of the Pharmaceutical Society of Great Britain. Compiled by E. M. Holmes, F.L.S., Curator of the Museum. London. 1892. Pp. xiv and 136.

Those interested in vegetable materia medica will appreciate the high value of this publication, which gives an insight into the patient and painstaking labor of the late Daniel Hanbury, in his pharmacognostical researches. The notes added by the critical editor supply a good deal of explanatory matter from more recent observations, and show that, with him, this was a labor of love.

State Agricultural Experiment Station, Amherst, Mass. Ninth annual report of the Board of Control, for 1891. Boston: 1892. 8vo. Pp. 352.

It comprises reports on the feeding of various animals, on the cultivation of various crops under different conditions, and on much analytical work done during the year.

Two Addresses upon Joseph Leidy, M. D., LL. D. By William Hunt, M. D. 8vo. Pp. 60.

A Sketch of the Life of Joseph Leidy, M. D., LL. D. By W. S. W. Ruschenberger, M. D. Reprinted from Proceedings of the American Philosophical Society. 8vo. Pp. 64.

These are valued contributions towards a more comprehensive biography of an eminent scientist. The second pamphlet contains an excellent phototype portrait of the deceased.

Der Schutz des Chloroforms vor Zersetzung am Licht und sein erstes Vierteljahrhundert. Zeitgemässe historische und chemische Studien von Dr. Ernst Biltz, Apotheker in Erfurt. Erfurt: A. Stenger. 1892. Pp. 58.

The protection of chloroform from decomposition on exposure to light, and its first quarter-century. Appropriate historic and chemical studies.

A very interesting and valuable monograph, in which the influence of light in the presence of air upon pure chloroform is shown, as well as the partial protective influence of alcohol, and the absolute protection through the exclusion of light; for practical purposes, both agencies are required in order to preserve chloroform unaltered.

OBITUARY.

Dr. William Dymock died at his residence, Malabar Hill, Bombay, April 30, of influenza. He joined the Bombay medical service in 1859, was for a couple of years attached to the Indian navy, and in 1871 was appointed medical storekeeper to the Indian Government, in which position he largely increased the local manufacture of galenicals, introduced the most improved machinery for their manufacture, and increased the efficiency of the pharmaceutical department of the service. To the world at large he rendered eminent service through his researches on the materia medica of India. Beginning with his paper on the asafetidas of the Bombay market in 1875, a number of his contributions to materia medica have been republished in this Journal. The last publication in which he was engaged as one of three authors is that of the Pharmacographia Indica, of which the sixth and last part was not quite completed at his death; the five parts published have been duly noticed in this Journal. In 1887, Dr. Dymock was deservedly honored by being awarded the Hanbury Medal. Previous to that time he had been made an honorary member of the Pharmaceutical Society of Great Britain, and also of the Philadelphia College of Pharmacy.

Henry F. Formad, M. D., died suddenly in Philadelphia, June 5, in the forty-sixth year of his age. He was born in southeastern Russia, served as assistant surgeon in the Russian army, escaped threatened arrest on the charge of nihilism, and continued his studies at Heidelberg, where he graduated, and afterwards at the University of Pennsylvania, graduating from this institution in 1877; subsequently he became demonstrator of pathology, which chair he held until his death. He was well known for his pathological researches, and as an expert in medico-legal questions. For more than eleven years he had been coroner's physician.

George W. Pancoast, Ph.G., died at the Pennsylvania Hospital, June 23, aged 30 years. The deceased was an apprentice of the late J. W. Worthington, Moorestown, N. J., and graduated from the Philadelphia College of Pharmacy with the class of 1885. While charging a soda water tank at the Stackhouse pharmacy, on June 14, the gas being passed through a rubber hose into the tank, the latter exploded, causing compound fractures of the right thigh and leg, necessitating the amputation of the injured member. Death resulted from exhaustion, due to secondary hemorrhage. The deceased was a careful, conscientious pharmacist; he became a member of the College shortly after he graduated.

George Webb Sanford, a distinguished British pharmacist, died May 16, 1892, at Cromer, in the same house in which he was born in 1813. It is said of him that, since the death of Jacob Bell, he had achieved more substantial good for pharmacists than any other member of the Pharmaceutical Society of Great Britain, of whose Council he was a member for twenty-four years, serving part of the time as vice-president and as president. It was during his presidency and largely due to his efforts that the British Pharmacy act of 1868 was passed.